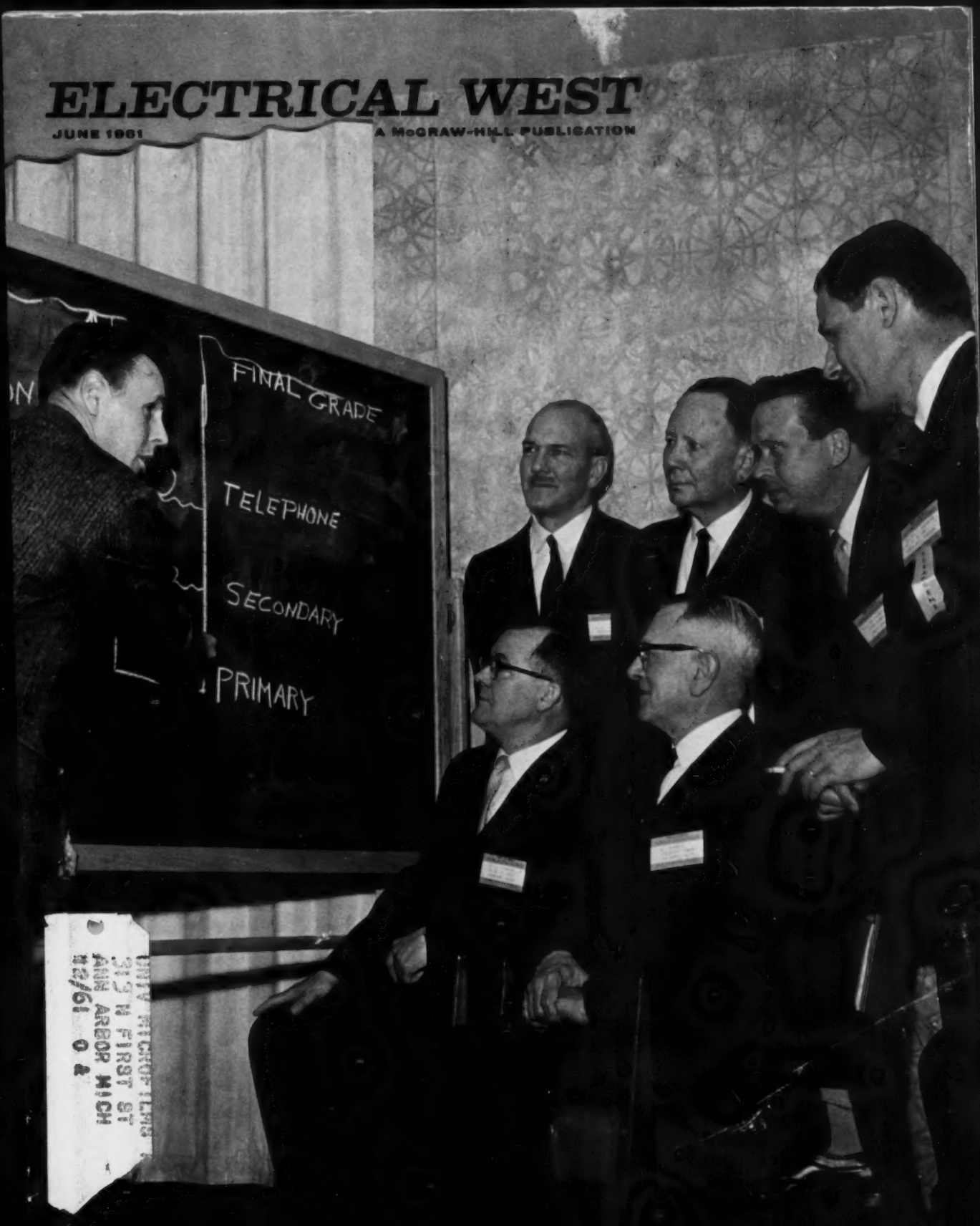
# ELECTRICAL WEST

JUNE 1961

A McGRAW-HILL PUBLICATION

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**CONVENTION ISSUE**

The new ideas electrical men are discussing. You can put them to work.

# Double Protection for Pole-Type Transformers

## ❶ INSULATED "Quick-Grip" TERMINALS ❷ INSULATED "Celuclad" COVERS

Kuhlman pole-type transformers are fully protected by covered high voltage terminals and insulated covers against any possible service interruption caused by wildlife.

The unique protective design of Kuhlman "Quick-Grip" hand connectors prevents outside contact with all live parts. Thus birds and animals cannot short circuit across the two high voltage terminals or cause a line-to-ground short between terminals and the transformer cover. "Quick-Grip" also adds the convenience of simpler, easier line connections without the use of tools.

### *"CELUCLAD"* COVERS ARE ADDITIONAL PROTECTION

As further protection, Kuhlman transformers are equipped with "Celuclad" insulated covers. The extra heavy "Celuclad" coating provides high dielectric strength and greater weather resistance. It is the same heavy-duty, corrosion-resistant finish furnished by Kuhlman for industrial and salt spray atmospheres.

Only Kuhlman offers the double protection of "Quick-Grip" and "Celuclad." Ask your Kuhlman representative about *all* the many extras which are standard on Kuhlman transformers this year.

**KUHLMAN**
**TRANSFORMERS**

**KUHLMAN ELECTRIC COMPANY, Birmingham, Mich.**

*Manufacturers of transformers since 1894*

**Western Division—Salinas, California**

# Keeping Business Healthy

*No single factor is more important to the future of America and to the world at large than is the local community. . . . . If our communities are strong, America will be strong. If they are weak, America will be weak.*

DEMOCRACY IS YOU BY RICHARD WAVERLY POSTON

In the last article of this series it was pointed out that real job security is based primarily on working for a healthy growing and prosperous company. While many of the causes that make companies get sick or die are the primary concern of top management, one of the most important of all is the direct responsibility of the people of a community (including the employees of the company) to create a business climate that helps, not hinders, the development of the job-producing organizations whose pay rolls and activities are generally the fundamental reason why the community exists at all.

Building a good business climate is as important to employees as it is to management. Communities that have a high rating in this respect are good places to live and raise families. They offer the opportunities that come from growth because they attract new businesses to their area. They provide a wholesome atmosphere of social and cultural facilities that make them a stimulating and interesting place to live. They reflect the interest and attitude of good citizens who take their responsibilities of citizenship seriously.

As a citizen of a community, it might surprise you to know that there are nearly 100 civic, social, cultural and economic questions that have to be answered correctly if your community is to get top billing for its business climate. Every one of these questions is affected by the collective attitude of the people of the community.

For example, public attitudes are important. Some of questions you might ask in this area are: Are local newspapers biased against labor or business? Is there a lack of public interest in local politics? Do racial or religious prejudices exist? Are the people friendly or unneighborly?

A progressive and efficient local government is vitally important. This, too, depends on the attitude of the electorate. Such things as poor garbage collection, inadequate parks, poor street lighting and traffic control, graft or wasteful municipal practices, indifferent zoning restrictions, a bad or inadequate water supply and many other similar factors determine not only whether a business wants to grow and expand in the community but also whether it is a pleasant and secure place to bring up the family.

Educational facilities, too, are an important yardstick in measuring the business (or living) climate. If schools are inadequate, teachers poorly paid, school taxes too high and school administrators indifferent the community will not attract either people or businesses. In the same way, if the lack of community spirit fails to produce enough good hotels, good shopping facilities, well planned recreational facilities, adequate hospitals, libraries and similar facilities, not only is community growth held back but the opportunities for the good life is limited.

Passengers riding the main line of the Pennsylvania Railroad between New York and Washington have seen the slogan "What Chester Makes, Makes Chester." This little slogan pretty much sums up the objectives of a good business and social climate in any community. Building such a climate is almost like pulling yourself up by your boot straps. When the climate is favorable, existing businesses grow and expand and new industries choose to settle there. This brings in more families, creates jobs, broadens the tax base and adds to the reservoirs of money and human energy by which the community can improve still further.

All of us would like to make our communities a better place to live but that won't happen unless the majority of the people are willing to assume their responsibilities at the ballot box, in community welfare activities and in the cultural programs that mold our youth and strengthen our moral fiber as a people. Best of all, by merely being a good citizen, each of us is safeguarding our security and our future by providing an environment in which the companies that employ us can expand and prosper.

**You won't have any trouble finding a factory location; all the old businesses have moved out**

Under the bed

Let's have dialogue

Capital—how to get it

Be dedicated and tough

*Convention Time: See story p 70.*


# ELECTRICAL WEST

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**Cover: An interested group at the NELPA E&O meeting in Portland. At blackboard, Don Saldon/PGE; seated, Joe Cannon/WWP, Harold Randle/Calgary Power; standing, Frederick Green/BCE, Waldo Enns/PGE, Bill Clements/Utah Power, Allan Johnson/PGE. Photo courtesy of Portland General Electric Co.**

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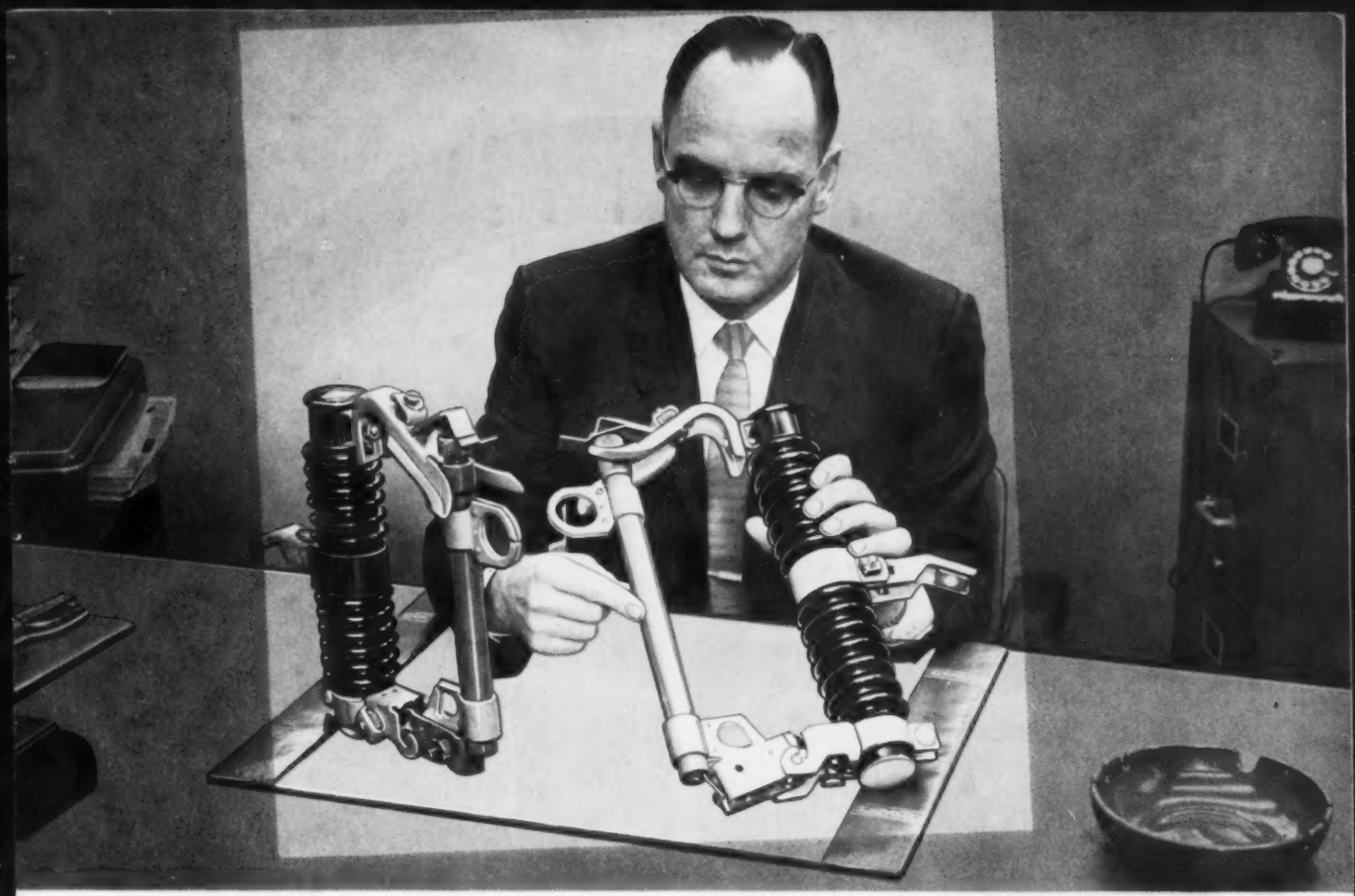

**Ray Rowe, Product Manager,** Protective Equipment and Capacitors, exhibits first production sample of the new economy type EDO fuse cutout. Built to meet the demand for low price, it offers many desirable features. Ask the L-M Field Engineer to show you a sample.

# New $16 L-M Open Type EDO Fuse Cutout Meets Need For Economy, Performance

To fill the requests of many operating companies for an economically priced, medium duty, open type cutout, L-M offers the Type EDO. Designed for savings plus performance, the EDO can be used with complete assurance where high fault capacity is unnecessary. Although maximum interrupting capacity is below present NEMA standards, the EDO has been tested and proved over the range of operations for which it has been designed.

The EDO has many desirable features, developed through L-M's many years of experience as a leader in fuse cutouts. The unit is small, compact. Fuse tube closes fully from any angle. Takes any standard button-head link. Fully bird-proof. Non-ferrous current-carrying parts. Rated at 100 amperes. The 7.8 kv unit costs as little as $16; the 15 kv is as low as $18. Available with link-break attachment if desired.

**RATINGS AND INTERRUPTING CAPACITIES**

| Voltage Rating —KV | Current Rating— Amperes | Interrupting Capacity— Amperes | Minimum 60 Cycle 1 Minute Dry Withstand Voltage —KV RMS* | Minimum 60 Cycle 10 Second Wet Withstand Voltage | Impulse Withstand Voltage on 1½ x 40 Microsecond Wave—KV* |
|---|---|---|---|---|---|
| 7.8 | 100 | 3000 | 27 | 24 | 75 |
| 15 | 100 | 2000 | 35 | 30 | 95 |

*In accordance with "NEMA Standards For High Voltage Fuses," Section SG2-3.18.

### Get complete information on fuse cutouts

L-M offers a complete line of protective equipment, including a variety of both open and closed cutouts. Ask the L-M Field Engineer for information from L-M's extensive file on system protection. Or write Line Material Industries, Milwaukee 1, Wisconsin. In Canada: CLM Industries, McGraw-Edison (Canada) Limited, Toronto 13, Canada. 513

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## Meetings Calendar

**JUNE**

1-3—*Tri-State Electric Cooperative*, Oregon, Washington and Idaho, annual meeting, Shore Lodge, McCall, Idaho.

1-11—*Construction Industry Exposition & Home Show*, 16th annual home show, Los Angeles Memorial Sports Arena, Los Angeles.

8-9—*National Electrical Manufacturers Assn.*, Western conference, Biltmore Hotel, Los Angeles.

11-14—*Electrical Apparatus Service Assn. (NISA)*, national convention, Jack Tar Hotel, San Francisco.

15-16—*Northwest Public Power Assn.*, Engineering and Operations Section annual meeting, Marion Hotel, Salem, Ore.

26-28—*Canadian Electrical Assn.*, annual meeting, Banff Springs Hotel, Banff, Alta.

**JULY**

4-7—*National Society of Professional Engineers*, 27th annual meeting, Olympic Hotel, Seattle.

9-14—*Los Angeles Summer Market*, Home Furnishings Mart, Los Angeles.

17-21—*San Francisco Summer Market*, Western Merchandise Mart, San Francisco.

18-20—*Western Plant Maintenance Show*, Pan Pacific Auditorium, Los Angeles.

**AUGUST**

22-25—*Western Electronic Show & Convention*, Cow Palace, San Francisco.

22-25—*American Institute of Electrical Engineers*, Pacific general meeting, Hotel Utah, Salt Lake City.

**SEPTEMBER**

6-8—*Northwest Public Power Assn.*, Power Use Section, annual meeting, Pacific University Campus, Forest Grove, Ore.

10-13—*Rocky Mountain Electrical League*, annual convention, Jackson Lodge, Wyo.

11-13—*International Association of Electrical Inspectors*, Northwestern Section, Owyhee Hotel, Boise, Idaho.

17-20—*National Association of Electrical Distributors*, Western regional conference, Jack Tar Hotel, San Francisco.

17-21—*IAEI*, Southwestern Section, Hotel del Coronado, Coronado.

20-21—*Electric Companies Public Information Program*, workshop conference, Brown Palace Hotel, Denver, Colo.

20-22—*Northwest Electric Light & Power Assn.*, 54th annual meeting, Sheraton-Portland Hotel, Portland.

**OCTOBER**

3-5—*Electric League of Southern California*, Lighting Progress Exposition, Palladium, Hollywood, Calif.

5-6—*Northwest Public Power Assn.*, Accounting and Finance Section, annual meeting, Everett, Wash.

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The singlephase J3T combines Sangamo's new J3 watthour meter and the Lincoln watt demand meter into a single unit. PW polyphase meters combine Sangamo's new P20 two stator watthour meters with two element Lincoln watt demand meters. The magnetic floating system further increases the established dependability of these combination thermal meters.

These new meters are compact and use conventional round covers. They retain the proven advantages of previous Lincoln demand meters: independent watt demand and watthour measurement, dual range, sectionalized construction, and interchangeability.

Your Sangamo Representative has the full story on both the J3T and PW meters. Ask him to show you these new developments in demand meters from Sangamo . . . the acknowledged leader in demand measurement.

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# BOOKS

S. Z. Mitchell and the Electrical Industry *by Sidney Alexander Mitchell, Farrar, Straus & Cudahy, New York City, $5.*

This is a must reading for every member of our industry under 45 years. Men in this age group can relive the exciting formative years of the industry they now serve. Mitchell's life spans the development of the industry from the earliest of Edison's lamps and machines into the 1930s. The book makes clear the role capital plays in the successful operation of a power company. As the reader watches Mitchell meld companies such as Idaho Power, he sees a businessman's dedication to serve the public, using the tools of engineering and finance. The reason for holding companies—and their value to the young industry—becomes apparent.

It is more than just a biography of a distinguished father by his son. It is the story of a dedicated man and the things he was able to do. S. Z. Mitchell was the power utilities' Horatio Alger. Read it!

Electrical Noise *by W. R. Bennett. McGraw-Hill Book Co., $10.*

How noise originates in electrical circuits, the terms in which it is described, how it is measured and how circuits may be designed to minimize undesirable effects from noise are presented.

Fundamentals needed for analyzing basic sources of noise are covered, and methods of measurement and design are stressed. A discussion of the relation of signal and noise in communication systems of various types is included.

Practical Electrical Wiring *by H. P. Richter, Sixth Edition, McGraw-Hill Book Co., $7.95.*

Practical methods for handling wiring and installation jobs are presented in this manual. It shows how to plan and carry out all types of lighting and power wiring jobs on the farm, in homes, factories, stores, schools and other structures.

In addition to presenting fundamentals, terminology, basic principles, theory behind practices and practical wiring instructions, the book includes hundreds of on-the-job tips and short-cut suggestions.

Thoroughly rewritten, the sixth edition has been revised to be in line with the 1959 edition of the National Electrical Code.

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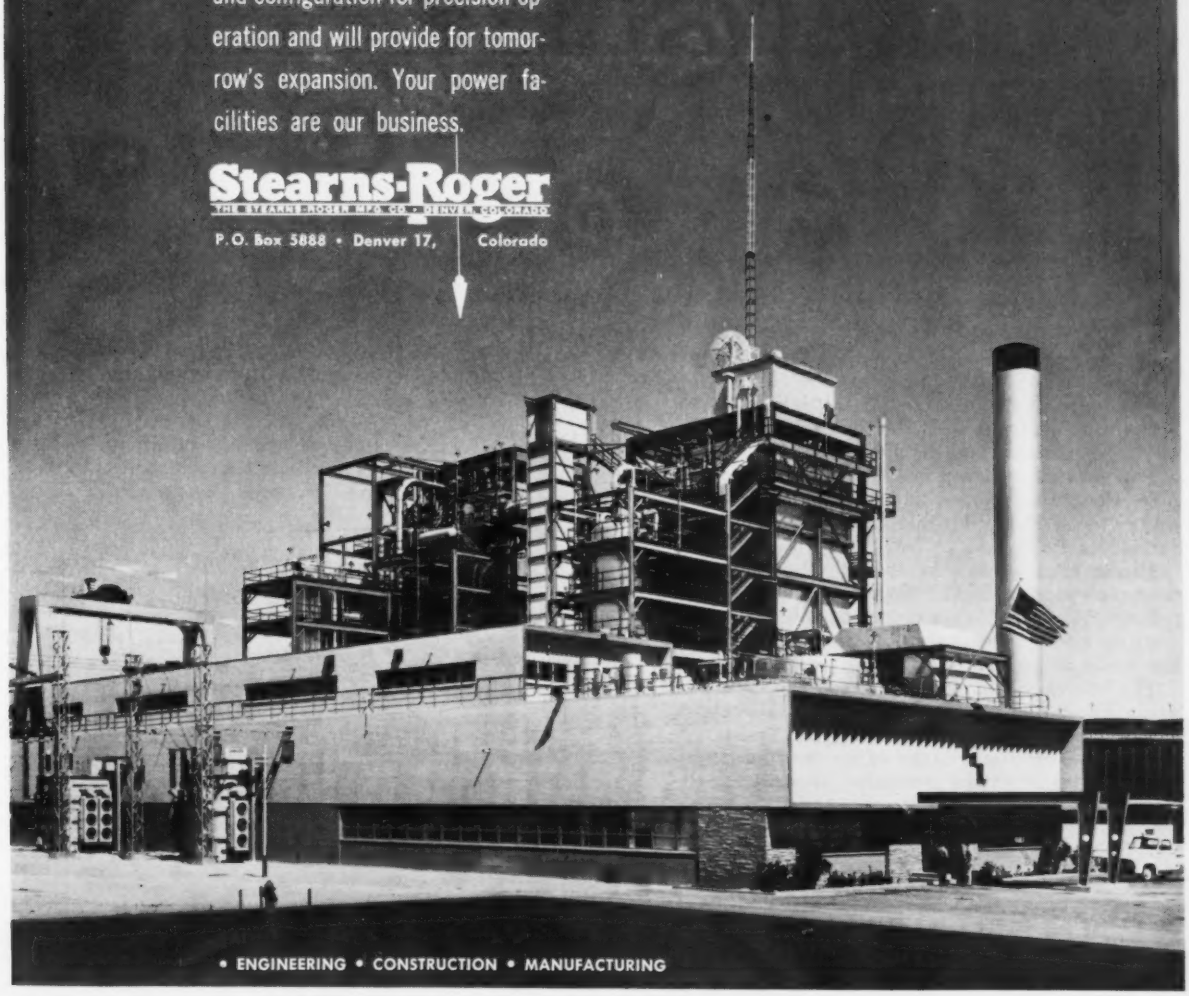

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## $435.00

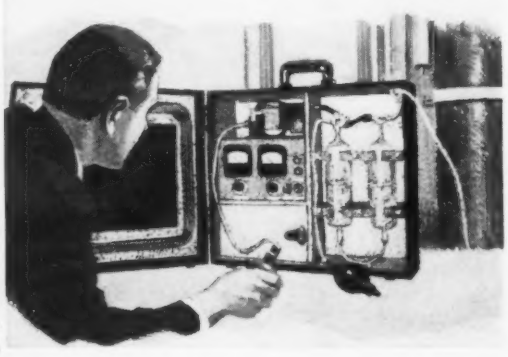
Low energy faults—insidious minute arcing or local heating—produce many combustible gases by decomposition of oil and solid insulation. These accumulate and mix with the nitrogen above the oil of transformers and regulators.

Pennsylvania's new Fault-Gas Detector recognizes these undeveloped faults, allowing the condition to be checked while the equipment is in service, carrying load.

Faults usually exist in an incipient stage for weeks or months before developing into major failures. When faults are detected, you can select the time and circumstances for an outage to make inspection or repair.

The accuracy and effectiveness of the Pennsylvania Fault-Gas Detector, used as a preventive maintenance tool, has been proved with prototype instruments by the analysis of gas samples from over 300 transformers in service. Incipient fault conditions found in eight transformers produced by several manufacturers were corrected before total failure and serious damage occurred.

Pennsylvania's Fault-Gas Detector can protect your service. Make its application a part of your routine preventive maintenance program. An entire test set, complete with instructions, can be purchased for only $435.00. For further information on incipient fault detection, contact the Service Department, Pennsylvania Transformer Division, McGraw-Edison Company, Canonsburg, Pa.



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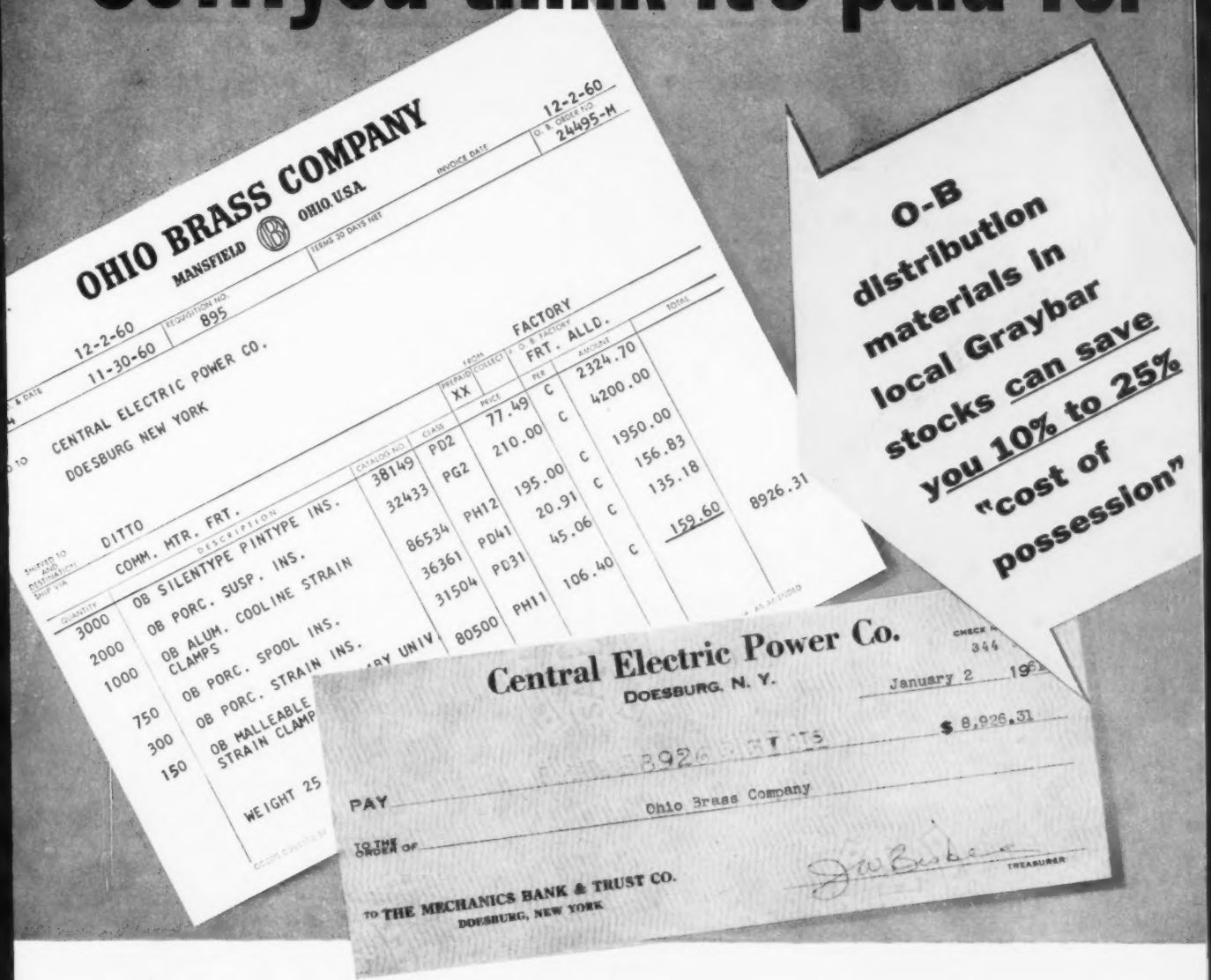


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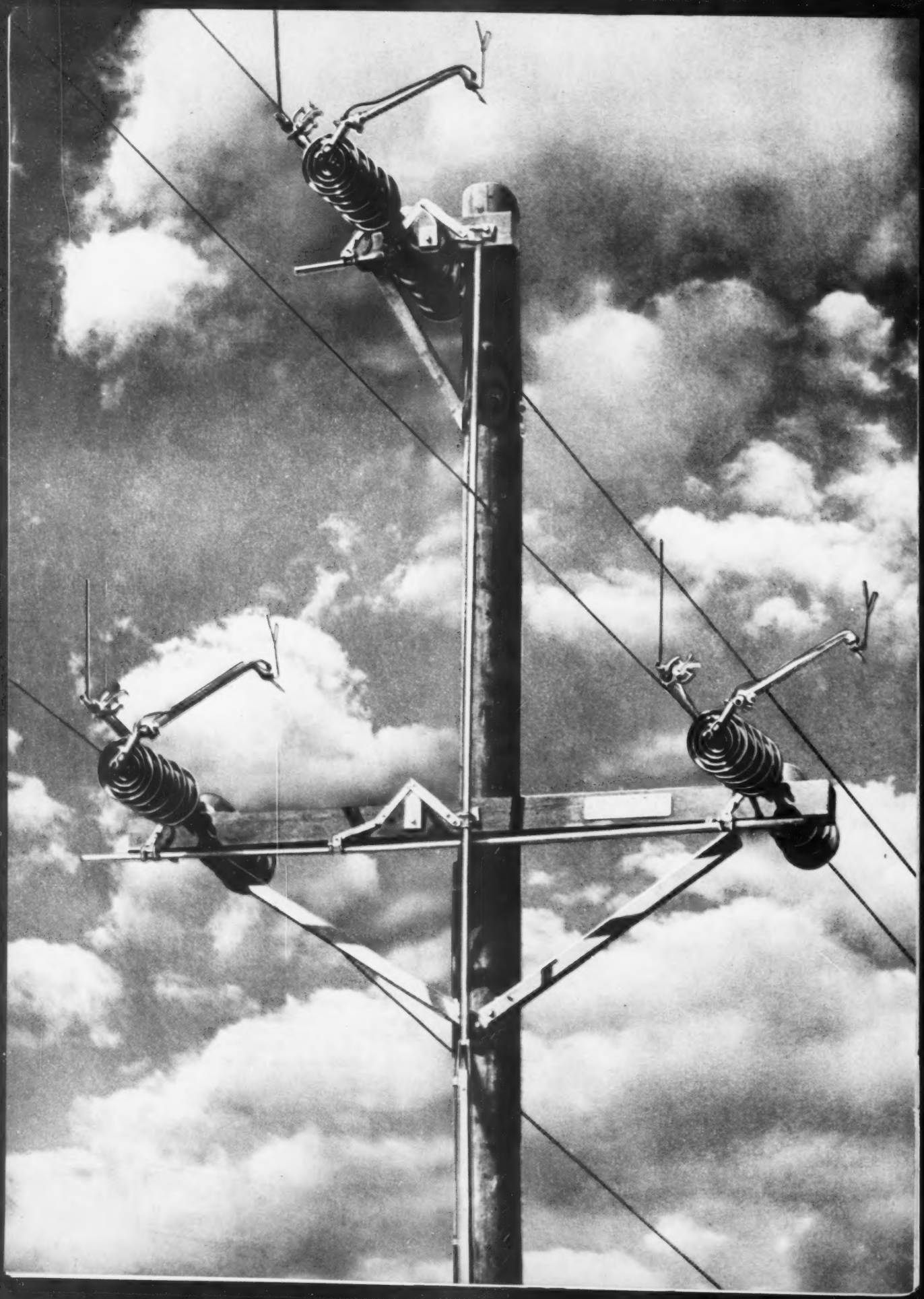

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Reliable performance is seldom achievable overnight. It is the product of sound basic design, careful manufacture, and conservative rating. And, beyond this, the years of experience and continual improvement that winnow out hidden problems common to most new products.

Your air break switches are the most significant single elements in your distribution lines. KPF's half-century record of operating dependability, of mechanical surety, is your comforting assurance of performance and safety.

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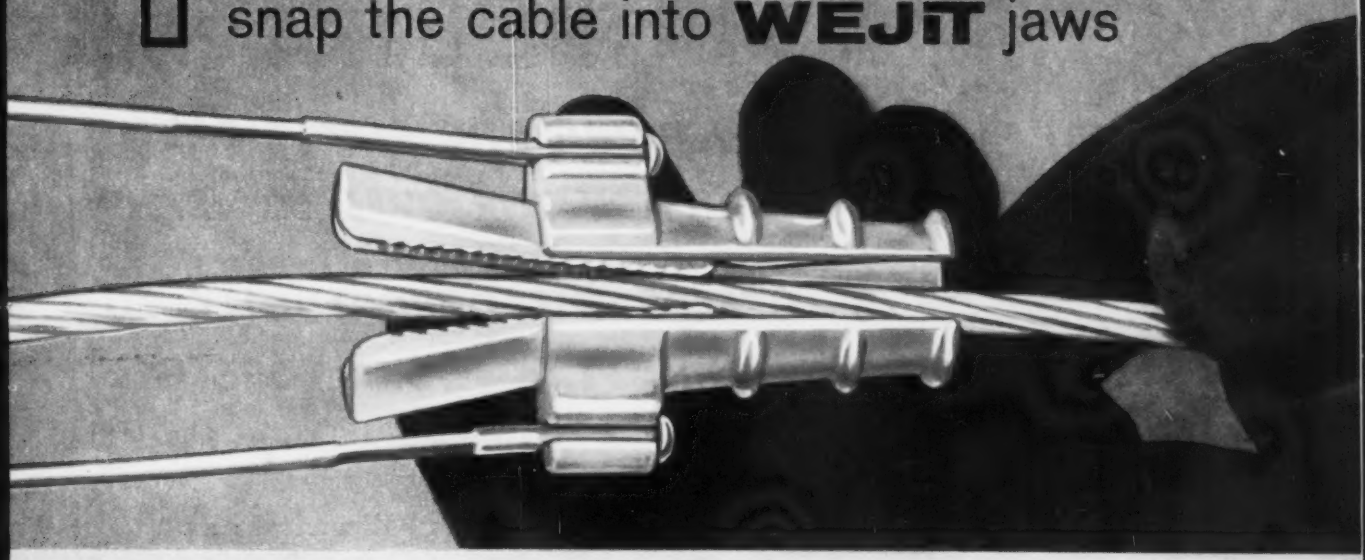
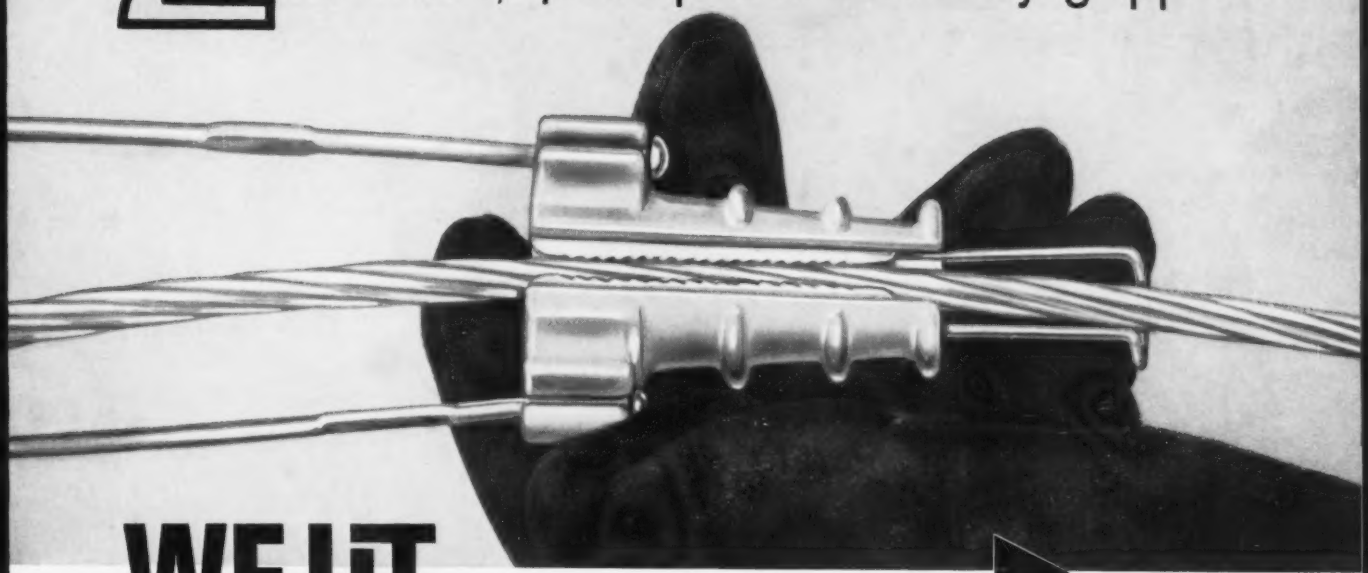


# 2 a short, quick pull...it's firmly gripped...



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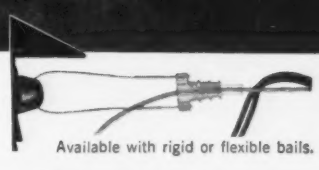

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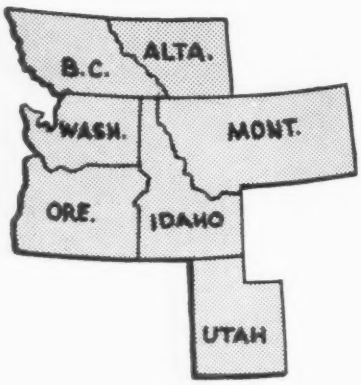



Electric Utility Companies, Electrical Manufacturers, Distributors, Contractors, Retailers and Service Companies join membership in NELPA to carry on activities which in part consist of:

* Workshop Conferences

1. Engineering & Operation
2. Business Development
3. Personnel & Safety
4. Accounting
5. Public Relations & Advertising
6. Purchasing
7. Rate Research

* Serving As A Voice For Tax Paying Electric Utility Companies That Serve Over 2,850,000 Customers In The Northwest.
* Conducting Industry Surveys.
* Clearing House For Information.
* Promoting The Progress Of The Electrical Industry So That The Public May Be Better Served. (Object Of NELPA)

**NELPA's utility members started 1961 with 866,500 Kw. of new power projects under construction. 266,500 Kw. to go "on the line" during this year.**

***NELPA Utility Members—Leaders in the Industry — average 6,899 Kwh. use per residential customer, more than twice the national average.***

***Associations Accomplish Those Things Which Most People Think Just Happen***

**NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION**

204 CORBETT BUILDING • PORTLAND, OREGON

# EHV-We're ready when you're ready!

One of Alcoa's newest conductors, 2.32 inches in diameter, is the largest ever used for overhead transmission. It is installed on the Penelec experimental 460-kv transmission line energized in October of 1960.

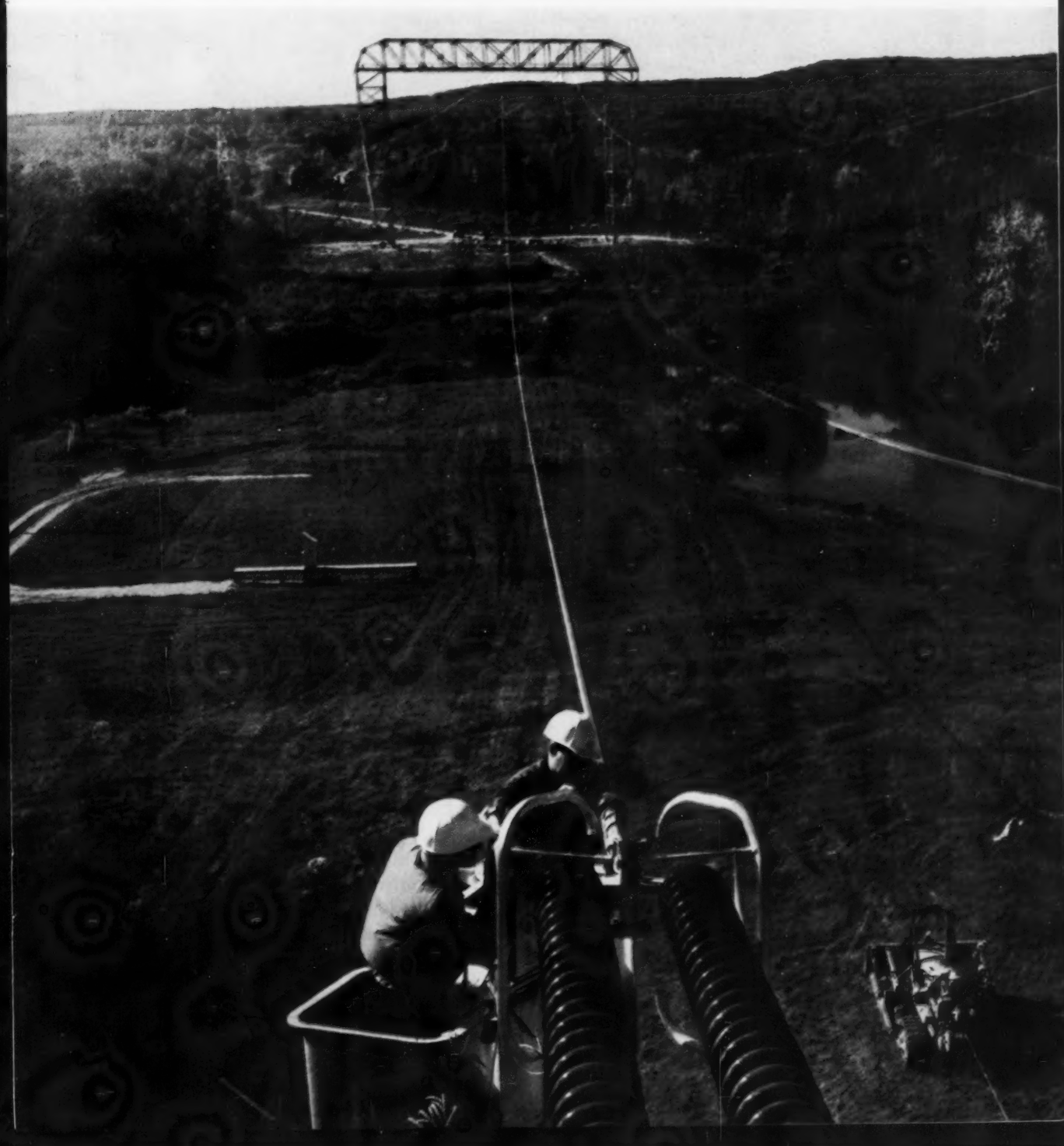
Cable of the same diameter, but of a slightly different design, is installed on General Electric's Project EHV (pictured below) in Pittsfield, Mass. Energized at a nominal voltage of 500 kv, this conductor is the first to be tested on this project.

Participation in such current projects is part of Alcoa's continuous preparation for the future. Historically, Alcoa has been involved in nearly all extra-high-voltage test projects.

*Consequently, Alcoa has manufactured conductor for more than 2000 of the nation's 2450 commercial EHV circuit miles energized at 345 kv or higher.*

Ready for EHV? We've been ready since 1913, when Alcoa pioneered ACSR to carry 220 kv. And we'll be ready any time you are.

ALCOA
ROME CABLE
DIVISION



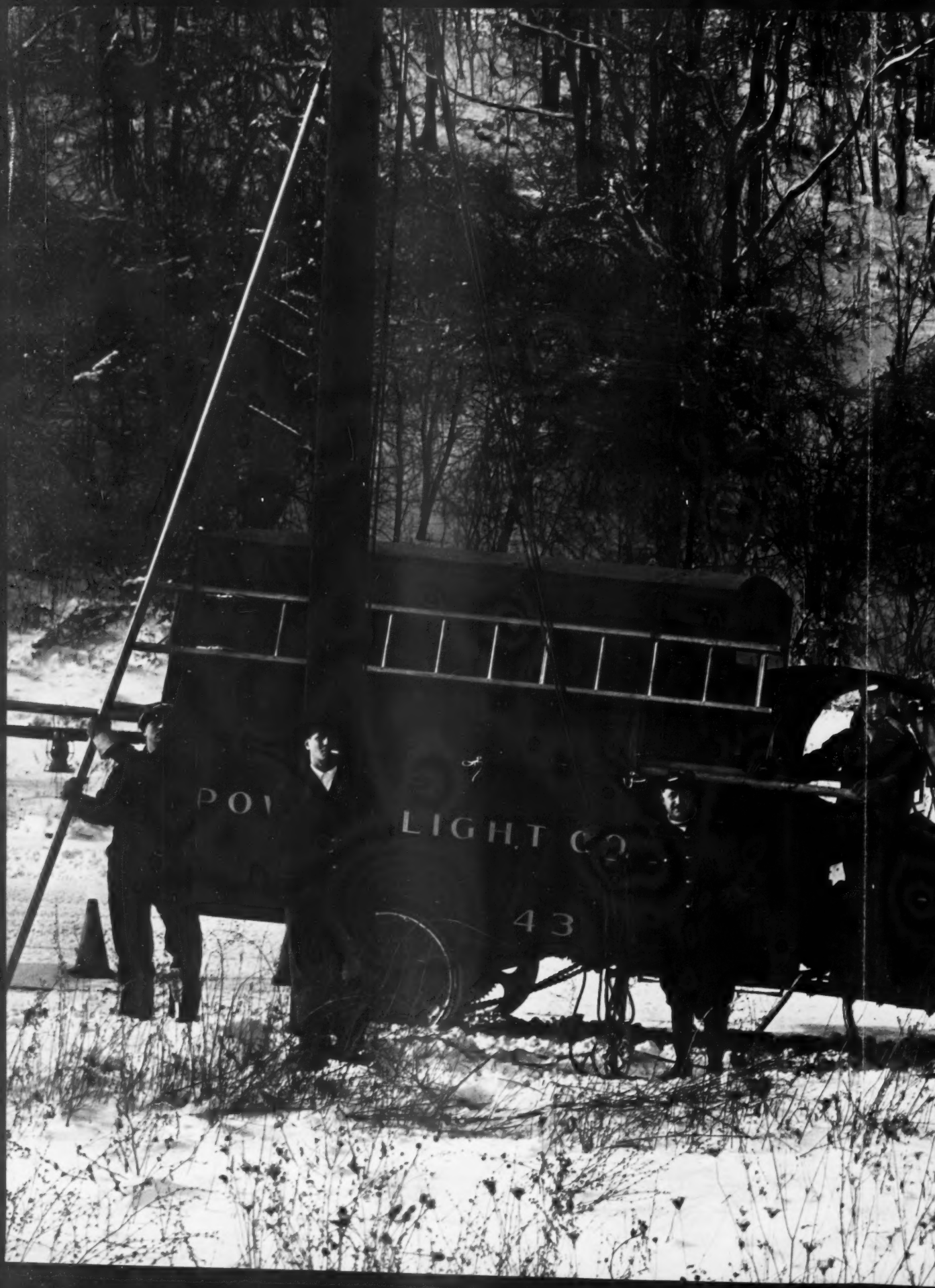
# This is uranium fuel

One of these pellets, in an atomic power reactor, will produce as much heat as a ton of coal. It will generate enough electricity to light an average home 2½ years. Pacific Gas and Electric Company's second atomic plant—a $20 million project near Eureka, California—will be generating 60,000 kilowatts of electricity in 1962. PG&E expects to break the cost barrier to economic nuclear electricity in this plant... a significant step in atomic research and development. The current investment in PG&E expansion is $500 million in just 15 months... on top of the company's $2.5 billion expansion since 1946, building ahead to serve California—a state on-the-grow.

P·G and E·
*Pacific Gas and Electric Company*

Is your distribution voltage regulation

# Obsolete?


LIGHT CO
43

# uno -reg

UNO
today.
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Is your method of regulation for distribution voltage as old fashioned as the chain driven line truck? Or does it include the Westinghouse UNOREG — a new idea in voltage regulation. UNOREG permits "head-end bucking"... a wholly new concept for regulating distribution feeders. It is as dramatically different from old forms of re-regulation as the contemporary line truck is from its 1923 forebear. It can save you thousands of dollars annually in regulating costs. How? Through modern thinking, planning and design, UNOREG can reduce your costly voltage regulator inventory, step up total system performance, and reduce your initial capital investment in regulation equipment by as much as 50%. There are huge savings in installation, in reduction of customer complaints, in service and application.

Photography by

**NOREG is truly the most modern form of voltage regulation available ay.** Install it and forget it. When this small (21½" high, 12¼" diameter) t goes up, you have a modern distribution regulator. The UNOREG ulates on the secondary and is independent of primary voltage. It re- ces inventory (just two models, the 1¼ and 2½ kva, cover over 630 ndard styles of distribution transformers). It represents a wholly new ncept of voltage regulation that can solve any distribution system voltage oblem. Compare UNOREG with any regulating device. You'll find it ovides the very best, most economical re-regulation available. Contact estinghouse for more information on the UNOREG—today's and to- rrow's answer to economical distribution.

**ou can be sure... if it's Westinghouse.**

aphy by Royal Kane, William Richards Associates, Inc. Litho in U.S.A.

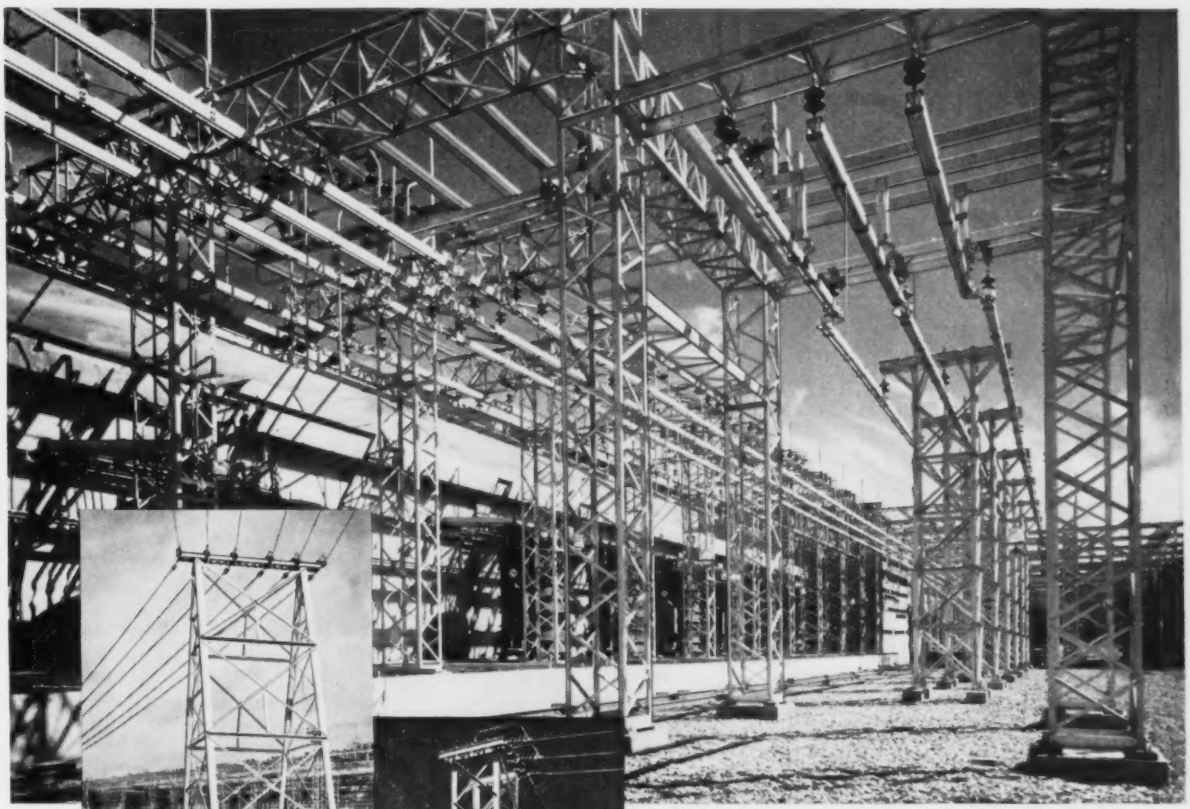
J1-70959

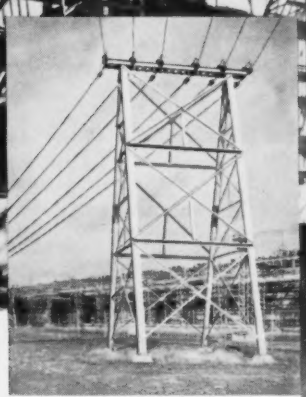
# REYNOLDS ALUMINUM "custom tailors" substations to lower your costs

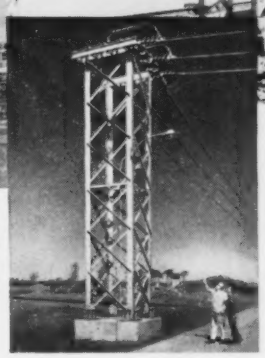
At Phoenix, Arizona, Reynolds Structural Fabricating Division is designing, fabricating and assembling structures in lightweight aluminum from the ground up, rather than merely substituting aluminum in conventional designs. Aluminum's light weight facilitates fabrication and assembly. And the strength plus light weight advantage of aluminum extrusions permit a 60 to 70% reduction in structure weight while retaining load-carrying capacities of structures made of heavier materials. The result: savings in metal, savings in weight, savings in shipping, handling, and erection costs.

Aluminum substations require an absolute minimum of maintenance. Aluminum never rusts. Periodic protective painting that over a period of years can cost more than the original structure is not necessary with aluminum. Also with aluminum, there's no problem of painting "hot" structures or costly shutdowns for maintenance. Corrosion-resistant aluminum structures are ideal for seacoast and industrial areas.

*Reynolds can offer a complete series of standard aluminum structural shapes or design new shapes to fit your requirements.* For complete information on aluminum substations that will deliver longer service at a lower per year cost, write *Reynolds Metals Company, P.O. Box 2346-EK, Richmond 18, Virginia.*







Various structural units for substations and switchyards can be built with standard aluminum structurals or structurals designed to meet specific requirements. In either case, prefabrication and assembly mean lower handling and erection costs.

Light, bright aluminum substations not only look good, but *stay new looking* without expensive maintenance.

Watch Reynolds TV show "Harrigan & Son", Fridays—ABC-TV

# Let's tackle our problems NOW!

**THE PCEA IS A WORKING ORGANIZATION** . . . its members are hammering out practical answers to the problems facing our growing industry in dozens of meetings throughout the year.

**PROBLEMS ARE CHALLENGES** . . . nowhere more critical than in the well-integrated electrical industry, where utilities and manufacturers, contractors and wholesalers count on each member of the electrical team to pull together so that the West's development will not fall short for want of kwh and the goods which generate, transport and consume them.

**PROBLEMS ARE OPPORTUNITIES** . . . equal to the challenges and responsibilities . . . larger and more profitable loads for utilities . . . bigger markets for manufacturers and wholesalers . . . more jobs for contractors . . . more customers for everyone.

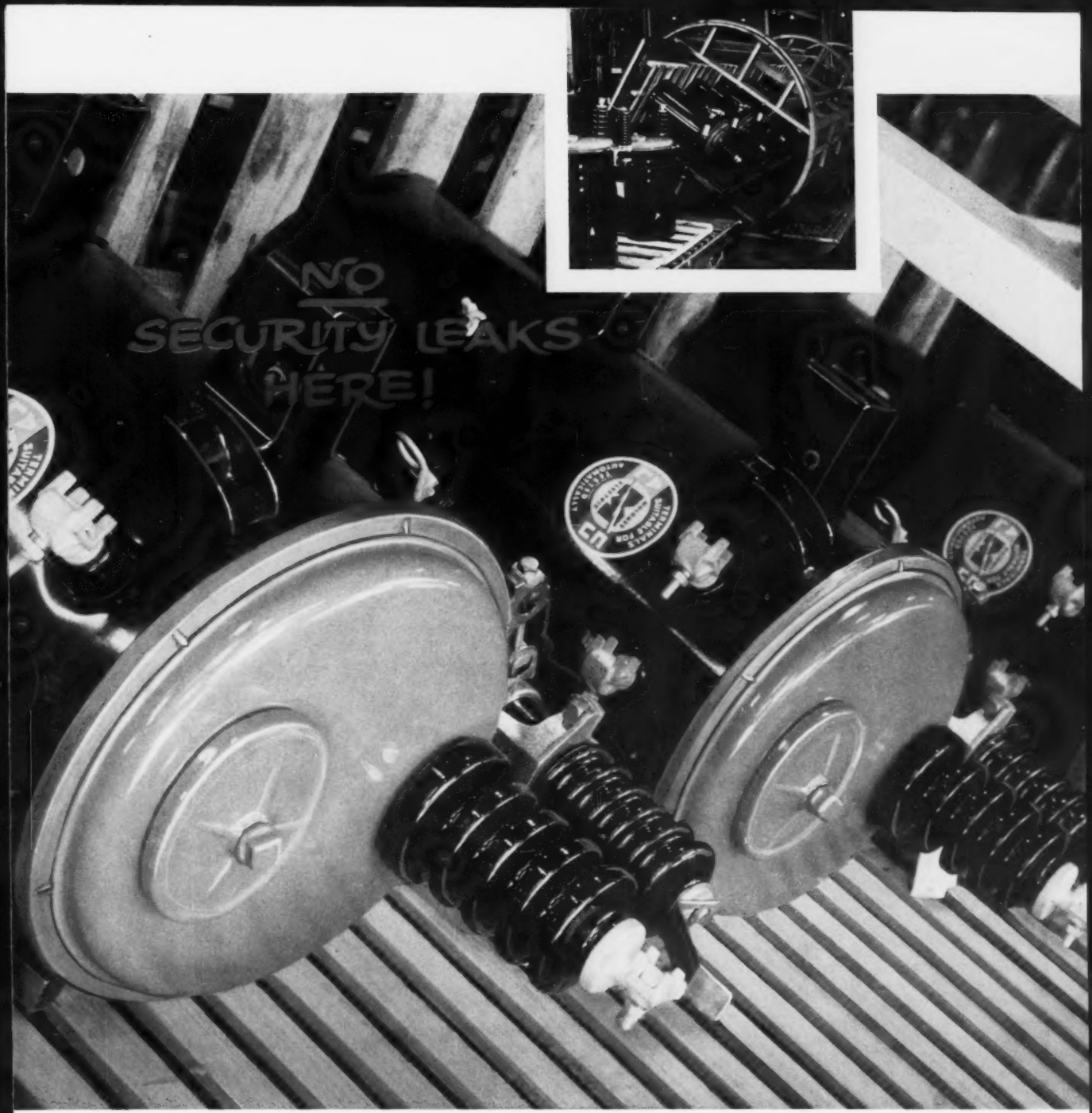
**A NEED TO WORK TOGETHER** . . . to understand the common problems and to share the common opportunities the electrical industry in the West more than ever before needs to "work with itself" in its own committee meetings and forums.

**PCEA STRENGTH** . . . is in the enthusiasm and energy of its individual members . . . numbering over 5,000 . . . thanks to them and their day-in and day-out efforts, this Association "gets things done that people think just happen".

## PACIFIC COAST ELECTRICAL ASSOCIATION

**530 West Sixth Street**
**Los Angeles 14**

**681 Market Street**
**San Francisco 5**




In the interest of security we literally turn things upside down looking for leaks.

Yes, Moloney Distribution Transformers are actually turned upside down during our Inversion Test. They must pass this security test which detects any leaks due to faulty seal.

When you purchase Moloney Distribution Transformers, you can feel secure from outages and frequent maintenance problems caused by moisture and sludging . . . two very subversive elements.

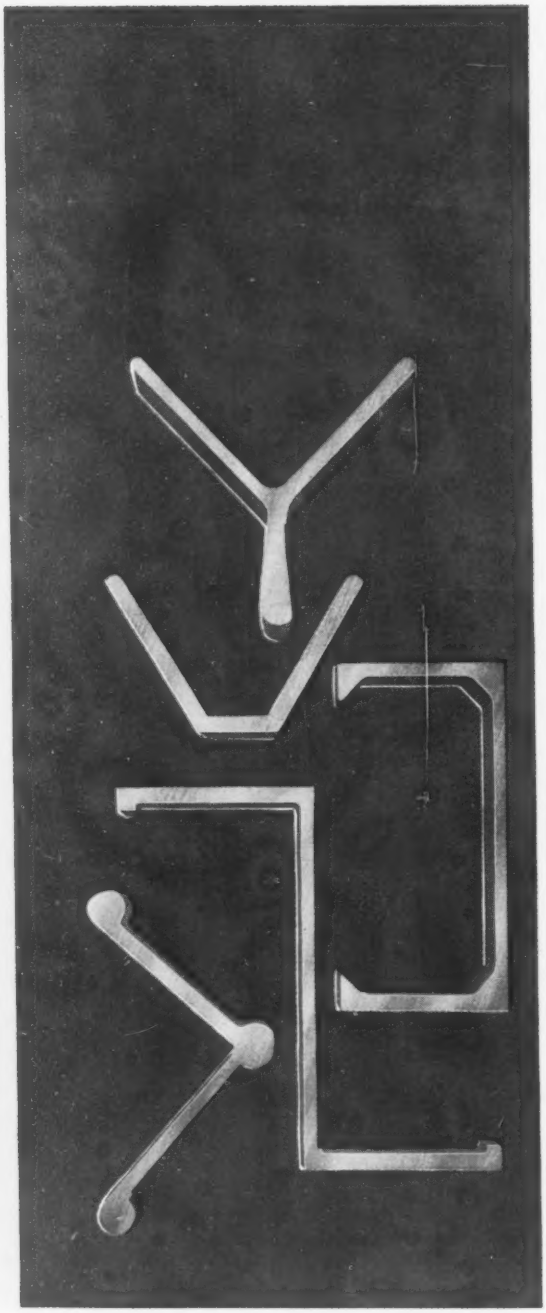
Specify Moloney Distribution Transformers, the best buy for your transformer dollar. MED1-9

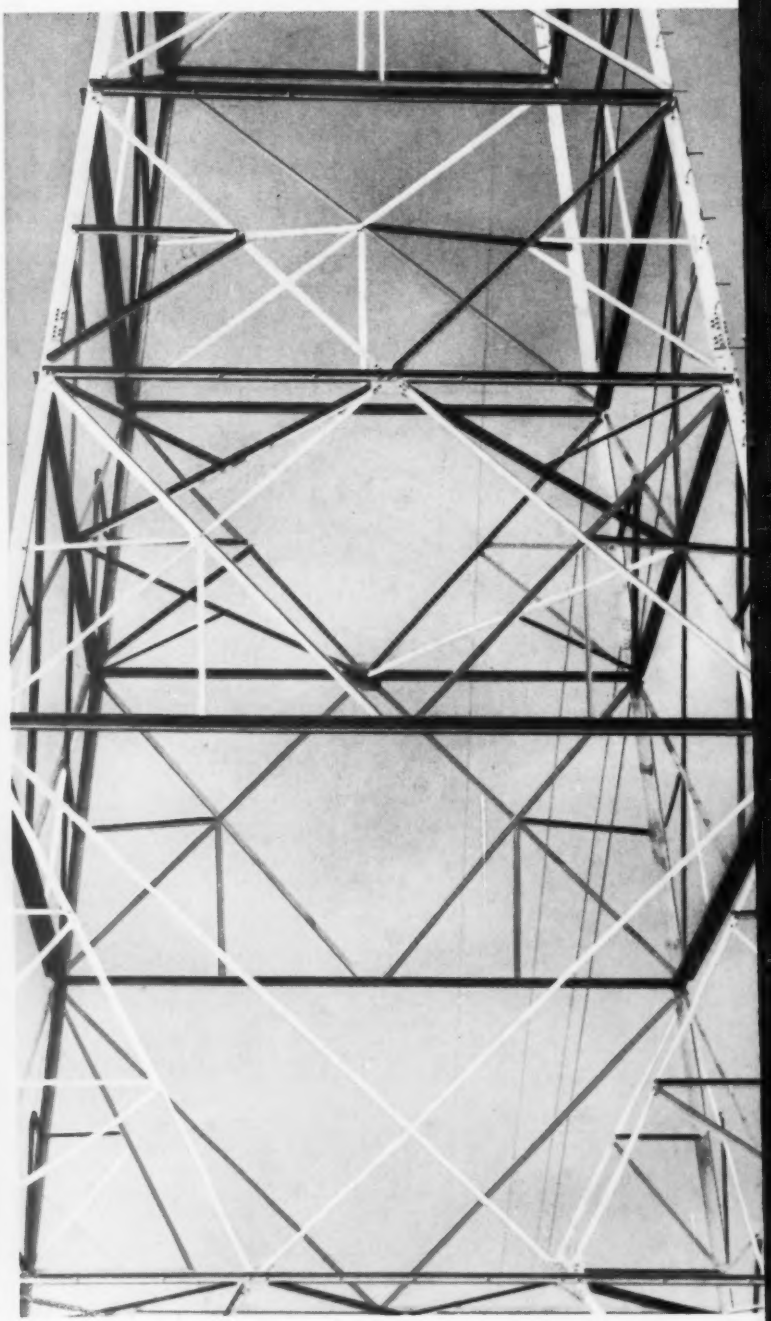
**MOLONEY ELECTRIC COMPANY**

*Manufacturers of Transformers for Utilities, Industry, and Electronic Applications*

SALES OFFICES IN ALL PRINCIPAL CITIES

FACTORIES AT
ST. LOUIS 20, MO., AND TORONTO, ONT., CANADA





# Alcoa Structural Division designs and fabricates aluminum towers and substation structures custom-tailored to meet the job requirement exactly. Just

Write: Aluminum Company of America, Structural Division, 873-F Alcoa Building

one of the many significant reasons: a broader range of "alphabetical" cross sections – L's, Y's, H's, I's, T's, O's, C's and Z's.

ALCOA ALUMINUM

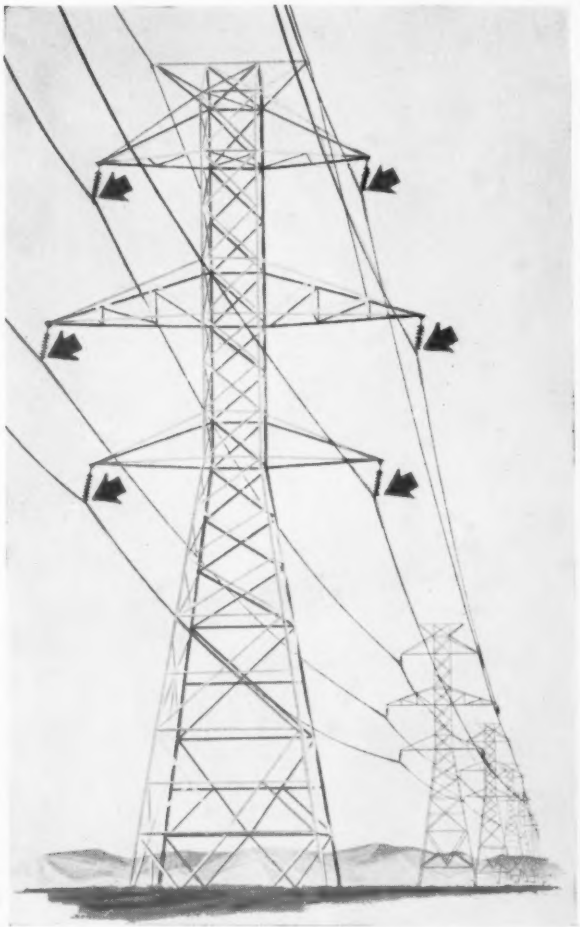
ALUMINUM COMPANY OF AMERICA

Pittsburgh 19, Pa.

*For phone number of closest representative see advertising index in back of book.*

# *Lifetime protection for less than 1/4 cent per T-Line dollar invested ...with* FANNER Superformed* ARMOR RODS

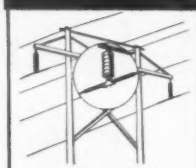
*at these vulnerable points*



For only a fraction of a penny per transmission-line dollar invested . . . Fanner SUPERFORMED armor rods give lifetime protection to conductors at vulnerable supporting points.

Top-quality products of the world's FIRST MAKER of machine-formed armor rods . . . Superforms are uniformly strong, dimensionally accurate, smooth surfaced, easy to install. Available for all conductor types and sizes. Learn how little so much extra protection costs. Call today.

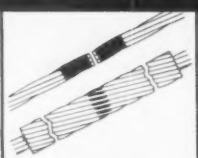
A FEW FANNER Superforms . . . and FINEST PLASTIC PRODUCTS



ARMOR RODS
. . . Protect long spans at supports

LINEGUARDS
. . . Protect short spans at supports

FANNGRIPS
. . . For dead-ending strands or conductors



FANNSPLICES
. . . For joining or patching strands

Plastic TREEGUARDS
. . . Protect conductor surface covering

Plastic KOVER-GUARDS
. . . Protect surface-mounted conductors

*A superior forming method in accordance with Patents No. 2,769,478 and 2,588,663—other patents applied for.

THE FANNER MANUFACTURING COMPANY
Brookside Park • Cleveland 9, Ohio

DIVISION OF TEXTRON, INC.

Fine Fanner Superformed Products

A-4545A

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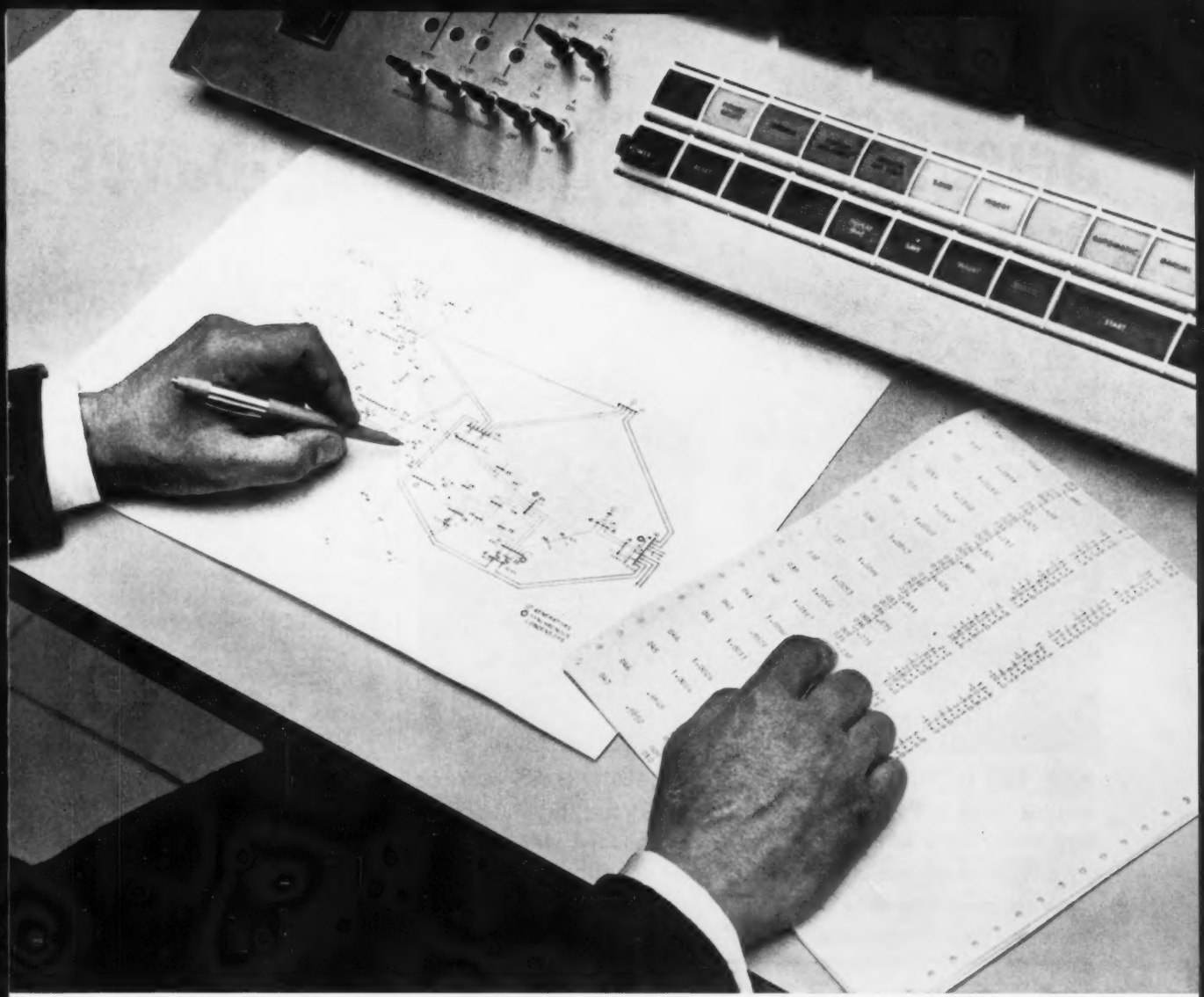
*For phone number of closest representative see advertising index in back of book.*



# Solve load flow studies in minutes with the low-cost IBM 1620

Now you can solve your system base case (up to 150 buses and 240 lines) in less than an hour... additional cases in minutes.

How? With the new Load Flow Program* for the IBM 1620 Data Processing System.

*You* simply enter the scheduled power input and voltage magnitude—or real and reactive loads at the terminals into the computer.

Your solid state 1620 automatically computes—and prints out fully or selectively—complete data on: *Voltage and angle* • *Net power* • *Load and generation* • *Line flows.*

You get direct entry to the base case for changes in loads, generation, transformer taps and capacitors. You can interrupt computation at any time to evaluate progress. And, because your 1620 produces complete data on cards or tape, you can run supplementary system studies at any time without having to solve the base case again.

Your local IBM Representative can give you all the facts. Call him.

*The IBM 1620 Load Flow Program is only one of many from IBM's extensive Program Library that now includes FORTRAN and GOTRAN. These free programs help you solve utility engineering design, system planning and operating problems, with a minimum of programming.

The IBM 1620 is a compact desk-size computer.

IBM®
DATA PROCESSING

# Scientific Sample Testing Saves

**NEW ELECTRONIC EQUIPMENT SPEEDS TESTING** of watthour meters. Using G-E's all-new transistorized Electronic Test Units (ETU)* almost any utility, large or small, can gain the many benefits offered by advanced electronic testing . . . greater accuracy, reduced testing costs, automatic data collection.

*Trademark of General Electric Company.

## UTILITY ACCEPTANCE GROWS

Utility regulatory commission acceptance of meter statistical sample testing is increasing. Today, just three years after the breakthrough by a southern utility, more than 21 electric utilities are using sample testing techniques in some form; and 17 regulatory commissions have approved the use of sample testing techniques in their states. In addition, at least 14 others are known to be studying sample testing or are planning to propose it to their commissions. With increasingly large numbers of meters being added to utility systems each year, the number of meters to be tested is rising sharply . . . and testing costs are increasing. It has been proved that statistical sample testing can perform this testing operation with a tremendous saving in time, money and material.

## *Utilities, G.E. Cooperate to Advance Practice of Meter Sample Testing*

**General Electric, with long experience in statistical sample testing in meter manufacturing, is working closely with electric utilities to promote better understanding of this practice throughout the industry.**

As a pioneer in statistical sample testing of meters—over 10 years, experience in the application of sampling techniques to meter manufacture—General Electric is cooperating with electric utilities to facilitate wider acceptance of this economical and efficient meter testing method.

For example, sample testing seminars—cooperative informational programs conducted by General Electric for over three years—make available to utility metering personnel a wealth of information on sample testing and proved statistical techniques gained from years of practical application of sampling to meter manufacture.

In addition, through the publication of articles, informational bulletins and other data, General Electric has contributed its knowledge of sample testing and sampling techniques to the electric utility industry.

As a leader in meter design and manufacture, it is General Electric's goal as a major supplier to provide electric utilities with the products necessary to make sample testing feasible—highly reliable, advanced-design meters that are certified for uniform accuracy and performance. With over 12,000,000 magnetic suspension meters in service without a reported bearing failure, this goal is now a proved reality.

In General Electric's meter laboratories at Somersworth, N. H., research is progressing on the meter of the future. Here, design innovations, new materials and manufacturing processes are under constant study and evaluation to provide utilities with the greatest possible value for their meter dollar.

# Two Utilities $1,000,000

## CERTIFICATION: Key to Statistical Sample Testing

Meter accuracy and performance are prerequisites for statistical sample testing. For more than 10 years, General Electric single-phase magnetic-suspension meters have been certified for accuracy and performance. Average accuracy is within 0.1% of reference kilowatt hour (average accuracy of each meter is within ±0.45% of this average); and G-E meters are certified 99.9% free of defects which might cause improper registration or operation. This is reliability, proved by over 12,000,000 G-E magnetic-suspension meters in service without a single bearing failure.

## *Annual Savings of $600,000 and $400,000 Estimated by Utilities After First Year's Operation of Meter Statistical Sample Testing*

SOMERSWORTH, N. H.—Greatly reduced testing costs resulting from meter sample testing were dramatically highlighted recently as two large electric utilities estimated their first year's savings. The results: a combined savings of over $1,000,000 as testing costs were reduced over $600,000 in one case, and $400,000 in the other.

Sample testing is basically the use of statistical methods to analyze and evaluate a group of similar meters from a properly selected sample.

Elimination of mass testing means that utilities can put their testing dollars to the best possible use—necessary testing is directed to groups of meters where it will do the most good. For example, modern meters are sample tested only to verify their continued performance, while older meters are given the amount of testing necessary to insure their accuracy is up to required performance standards.

In addition, the savings made possible by use of sample, rather than mass testing, can be used to mass-test existing older meters and to upgrade the entire utility metering system by replacing old, substandard meters.

This proved performance of statistical sample testing—which has also been used successfully in mass-production industries, government agencies and the U.S. Military Services—could provide the necessary impetus to accelerate its widespread acceptance by the entire electric utility industry.

The findings of the two utilities also point out another important aspect of statistical sampling. There is no "one best method" to sample test meters; there are many, depending upon the information desired. Each sampling plan must be designed to meet the needs of the individual utility.

Statistical sample testing is now gaining wider acceptance. As additional experience is gained in its use and application, continued advances will be made—advances that could mean even greater savings for the electric utility industry . . . a possible $70,000,000 annual savings in meter testing costs in just 10 years through the universal use of scientific meter sample testing.

713-06

## *Sampling's Goal: OPERATING COST BREAKTHROUGH IN METERING*

Properly applied to watthour meters, statistical sample testing is a tool which can help the electric utility industry achieve a primary goal: more accurate metering at less cost. The use of established sampling techniques in the testing of meters—rather than 100% initial and periodic testing—enables meter maintenance operations to be programmed and concentrated on those types or groups of meters which are found to perform outside acceptable limits. Thus, unnecessary testing—and unnecessary testing costs—of many thousands of accurate meters is eliminated. These savings resulting from sample testing can be applied to retiring and replacing old, inaccurate meters and mass-testing older meters that require such accuracy check—to raise the performance level of the entire system. And, the data gathered through the use of sample testing plans will provide more explicit and accurate information about meter performance, giving meter engineers the facts necessary to provide for the most efficient operation of their metering plant.

METER DEPARTMENT

GENERAL ELECTRIC

*For phone number of closest representative see advertising index in back of book.*

ANOTHER HOLAN FIRST

# NEW LD-40 ELBOW

## WITH HIGH DIELECTRIC STRENGTH, OFFSET YOKE *

One-step entry into the bucket at the rear of the truck is possible because of the offset yoke*.

*Patents applied for.

You save time right from the word "go" with the new Holan LD-40 Elbow. One step and you're in the easy-entry bucket. And one man controls every movement of the Elbow.

Ideal for re-fusing transformers, mid-span trouble work, installing customer service, insulator inspection, street light maintenance, telephone drop installations from mid-span — even maintenance of railroad catenary systems.

The exclusive offset yoke* not only facilitates bucket entry — *it increases versatility and working range.* Angle of the yoke — coupled with 90° lower arm, 135° upper arm travel — permits work over parked cars, over and between power and telephone lines, and on the property side of the pole. It reaches up 40', rotates 360° continuously in either direction.

It's safe, too. The molded fiberglass reinforced plastic bucket, yoke and upper arm can withstand a bucket-to-ground dielectric test in excess of 100,000 volts (A.C.).

Torsion bars and the reverse offset superstructure design eliminates stabilizing outriggers.

Want more details on this light-duty Elbow? Just call your Holan Field Representative . . . or write us.

HOLAN CORPORATION, 4100 W. 150th, CLEVELAND 35, OHIO

Holan

Subsidiary of THE OHIO BRASS COMPANY

HOLAN

KNOW YOUR SYMBOLS

This symbol stands for fusible switch

This symbol stands for QUALITY

THE SAFETY SWITCH THAT CHALLENGES COMPARISON!

# BullDog's general-duty safety switch – a star performer indoors and out!

All BullDog general-duty safety switches, in either indoor or raintight enclosures, combine these outstanding features for maximum safety and dependability:

- Minimum arcing—double-break switching
- Arc control—Vacu-Break® enclosed chamber
- Pressure contacts—Clampmatic® spring action
- Positive switching—direct handle operation

. . . Plus, all current-carrying parts are silvered. And with BullDog, you sell a complete line, competitively priced, that fills all over-the-counter calls for general-duty safety switches. The switches are available in both NEMA 1 and NEMA 3R enclosures. Challenge our field representative to prove these switches are the finest . . . or write BullDog for details.

BullDog Electric Products Division, I-T-E Circuit Breaker Company, Box 177, Detroit 32, Mich. In Canada: 80 Clayson Rd., Toronto, Ont. Export Division: 13 East 40th St., New York 16, N. Y.

*Consult the following Pacific Coast representatives:*

**Coast Electric & Manufacturing Co.**
1733 N. E. Seventh Ave., P. O. Box 7866
Portland 12, Oregon

**Young Electric & Mfg. Co.**
2134 Curtis St.
Denver 2, Colorado

**Safety Switchboard Company**
910-89th Avenue
Oakland 21, California

**BullDog Elec. Prod. Co. of Los Angeles**
3020 Supply Ave.
Los Angeles 22, California

I-T-E

**I-T-E CIRCUIT BREAKER COMPANY**
BULLDOG ELECTRIC PRODUCTS DIVISION

IN NEW

Wagner®

LIVE BETTER ELECTRICALLY

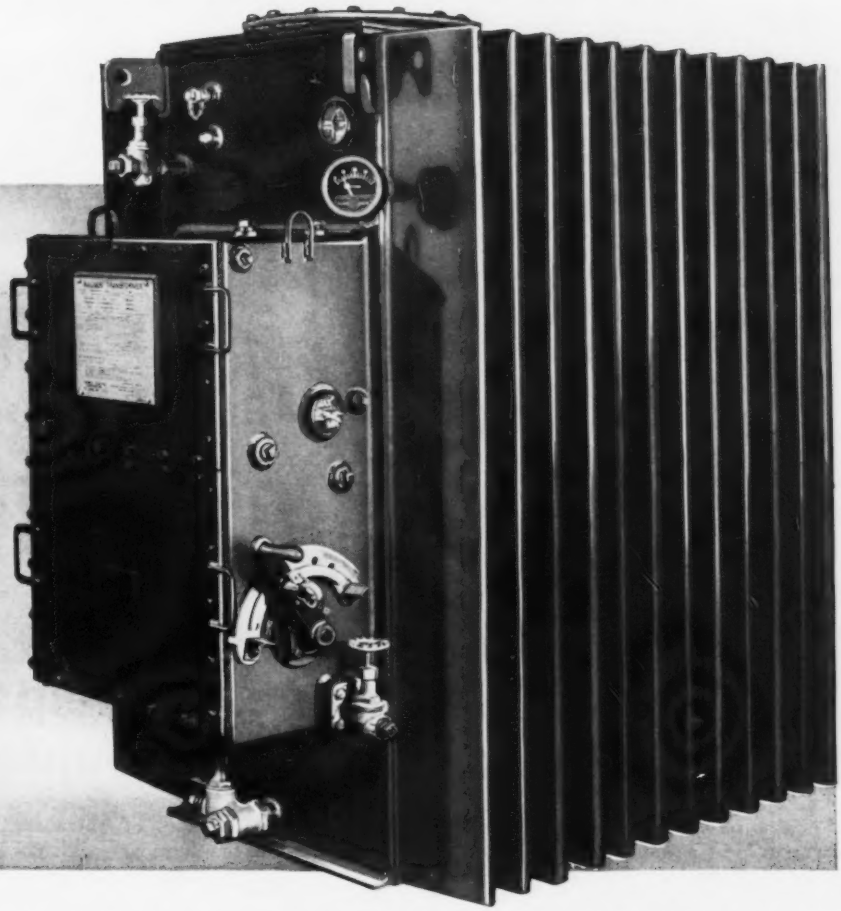
SIX 2000 KVA WAGNER NETWORK TRANSFORMERS installed on the system of Dallas Power and Light Company serve the Southland Center. The 42-story Southland Life Tower and the 600-room Sheraton-Dallas Hotel consume an enormous amount of power . . . power used, for example, by 15,800 lighting fixtures, 28 elevators, 8 escalators, an all-electric company cafeteria, and a 6,450 ton electrically-driven air conditioning system.

*SERVING 2 GREAT GROWTH INDUSTRIES . . . ELECTRICAL . . . AUTOMOTIVE*

# NETWORK SYSTEMS...or OLD

# Network Transformers

**will fit in close quarters... are small in size... have compact rotary switch... modern, corrugated cooling surfaces**



**WAGNER-DEVELOPED ROTARY SWITCH FOR NETWORK TRANSFORMERS**

**This smaller, lightweight, oil-filled high voltage switch—with matching cable termination compartment—was designed specifically to meet requirements of network systems.**

Wagner® Network Transformers are designed to give you smaller, lighter units, with smoother contours for easier maintenance. In new networks you can cut system costs by constructing smaller vaults to hold these space-saving transformers. In older systems you can put larger ratings in your present vaults. Maintenance costs are less, too. The corrugated radiators can be quickly cleaned from above, and an anti-corrosive tank finish protects exterior surfaces for years. A special undercoating on the base protects the transformer even under adverse conditions of underground installation.

CORRUGATED TANK-COOLING SURFACES eliminate dirt-catching corners. Radiating surfaces are easy to clean, and there are no hard-to-get-at spots to hinder painting when it's needed. Reliability is improved because there are fewer places for leaks to develop.

LOWER NOISE LEVEL has resulted from improvements in core design and materials, and newly developed methods of annealing the core steel. Lower noise levels are a feature of all Wagner transformers.

Over 65 years of constant research and development have made Wagner a leader in transformer design... made the Wagner name one of the foremost in power planning. For expert advice in solving your network transformer problems, consult your nearby Wagner Sales Engineer. There are Wagner branches in 32 principal cities.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

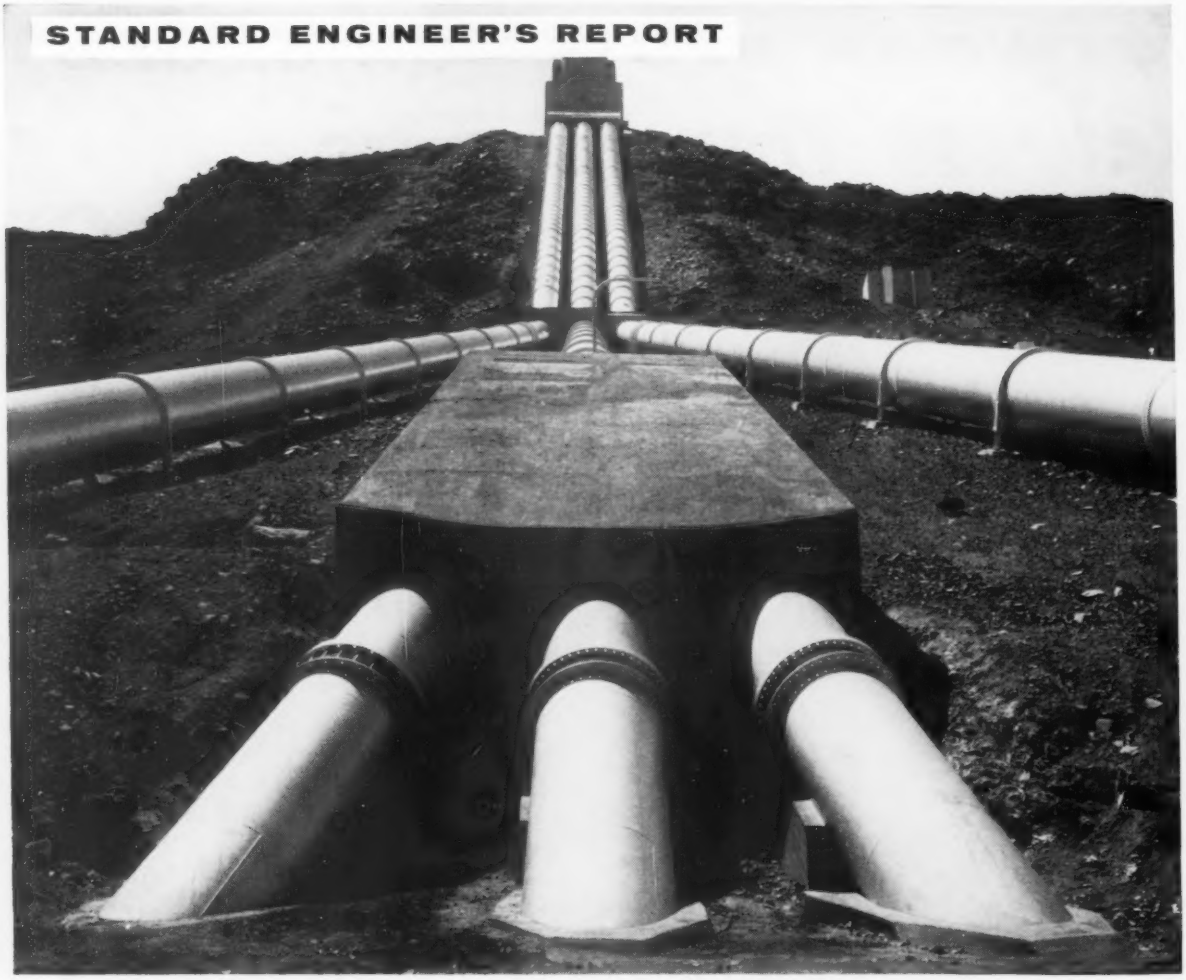
**Wagner Electric Corporation**

6381 PLYMOUTH AVENUE, ST. LOUIS 33, MO., U.S.A.

WT61-7

*For phone number of closest representative see advertising index in back of book.*

**STANDARD ENGINEER'S REPORT**



# Chevron OC Turbine Oil helps pump a river over Eagle Mountain!

**12,000 gallons of water a second** are forced over Eagle Mountain by the big pumping station near Desert Center, California. This station is one of five pumping plants on the 654-mile Colorado River Aqueduct System, longest and largest domestic water supply line in the United States.

**Chevron Turbine Oils** have been used here for over 20 years to lubricate all bearings in 200 cfs Worthington centrifugal pumps and 12,500 hp Westinghouse and Elliott motors. These three-story pumping units are continuously subjected to start and stop duty which is hard on bearings and on lubricants. Yet, in over two decades of service there has never been a lubrication failure.

**O. J. Thompson,** Station Chief, reports: "At our last major inspection, bearing surfaces showed only minimum normal wear. Chevron Turbine Oils have given outstanding performance ever since the plant was opened in 1939."

**This vast aqueduct system** is owned and operated by the Metropolitan Water District of Southern California. It supplies a billion gallons of water a day to 5 Southern California Counties, including 90 incorporated cities.

**Standard Lubrication Engineers,** working with MWDSC personnel, recently completed a thorough analysis of all lubricants and equipment in the system . . . to assure economical lubrication and high quality performance throughout.

**Lubrication Problems? Let a technically qualified Standard Engineer help you. The largest field force of lubrication engineers in the West is at your service. For this valuable free technical help or for information on any petroleum product, just call your local Standard office, or write Standard Oil Company of California, 225 Bush Street, San Francisco 20.**

CHEVRON Industrial Lubricants

**STANDARD OIL COMPANY OF CALIFORNIA**

TRADEMARK "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

# First from General Electric (1959)... another bright idea that became a better lamp for you...Quartzline lamp

# packs more light in less space than any other filament lamp

**Listen to the nearsighted Mister Magoo . . . "1959? Seems like last week! I volunteered but the authorities picked seven other Astronauts—and General Electric invented the Quartzline lamp. Happy birthday, Quartzline. Tarnation! This confounded pen won't write!"**

Understandable mistake, Mister Magoo. The 5-inch, 500-watt Quartzline *is* no bigger than a pen. But it's 19% more efficient than a regular lamp, never grows dim, and provides better light control than any earlier lamp.

Every Quartzline lamp stays almost 100% bright throughout its life—because General Electric engineering leadership found a way to keep tungsten vapor from blackening the glass. G.E. puts iodine gas in the lamp to catch the particles evaporating from the tungsten filament. Miraculously, the iodine re-deposits them, over and over again, on the steadily-bright filament. This process makes the 5-inch Quartzline last 2000 hours, twice as long as a regular bulb-shaped lamp.

**Use Quartzline with the right reflector, and it'll give a precise, powerful, rectangular beam of light in one direction—as narrow as 6° or as wide as 100°. No elaborate lens system is needed.**

Or take the big-brother model, the 10-inch, 1500-watt Quartzline. It's *50% more efficient* throughout its life than a standard 1500-watter of comparable voltage.

**Applications? Stadiums. Airport runways. Building facades. Show windows. Inspection or outdoor work areas. Don't worry about rain and snow. Quartzline resists thermal shock.**

Ask your G-E distributor for more information on Quartzline lamps—small proof of General Electric lighting leadership! General Electric Co., Large Lamp Dept. C-110, Nela Park, Cleveland 12, Ohio.

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*For phone number of closest representative see advertising index in back of book.*

# WHEN THE FUTURE IS ALL-ELECTRIC

*WHY BUY ANYTHING BUT A* ***TOTAL-ELECTRIC GOLD MEDALLION HOME?***

"In our new Gold Medallion Home, we get so much more of what we're really *living* for," says Mrs. Nowers. "I have more time for my family and for my community work, and I'm a much better home manager since we moved in. A home without everything electric would seem old-fashioned to me now. I'll never go back."

*Count the things that change for the better:*

**1. Flameless electric heat.** "It's like living in mild sunshine," says Mrs. Nowers. "Our walls and drapes stay remarkably clean."

**2. A flameless electric range.** "So cool and *fast*. And no other way to cook is nearly so clean."

**3. A flameless electric oven.** "The same good things can be said about my electric oven. In addition, the juice stays in the meat because I cook with heat that's moist, not dry."

**4. A flameless electric dryer.** "My clothes dry even sweeter and fluffier than they used to outdoors. I don't get any baked-in wrinkles, either."

**5. A flameless electric water heater.** "We get all the hot water we want, quickly and inexpensively," says Mrs. Nowers.

**WHAT IS THE GOLD MEDALLION HOME AWARD?**

It is an award given only to total-electric homes that are electrically up-to-date. When a new home meets Gold Medallion Home requirements you know it offers: *clean, flameless, electric space and water heating; a clean, flameless, electric kitchen*, equipped with major appliances; plenty of "*Housepower*"—modern wiring to handle today's and tomorrow's appliances; *abundant lighting*, planned for comfort, convenience and beauty.

***It costs so little to live better electrically. Why not move up to a total-electric Gold Medallion Home?***

**SOUTHERN CALIFORNIA Edison COMPANY**

Home of Dr. and Mrs. Walter J. Nowers, Palos Verdes Estates, California. Earl R. Mason, A.I.A., Architect.

# CHAFING DAMAGE?

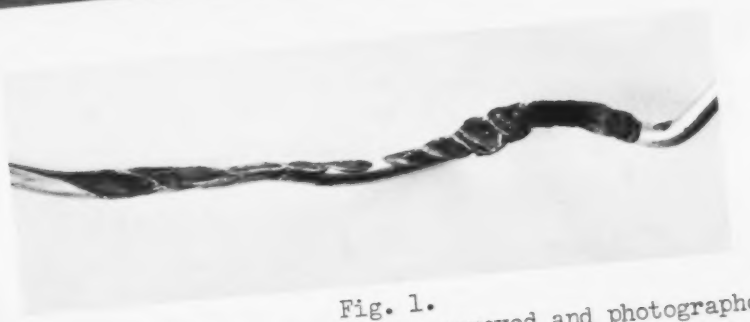

Fig. 1.
This badly abraded tie wire was removed and photographed during an inspection of the tie points on an undamped distribution line in a northwestern state. The line (1/0 ACSR - 6/1) was constructed in the Spring of 1959 and the utility made an inspection 17 months later. The damage was attributed entirely to Aeolian vibration.

Fig. 2.
Deep gashes in the armor rod, taken from the same line, illustrates the excessive chafing damage resulting from Aeolian vibration on undamped lines in locations where wind, temperature, and terrain are conducive to sustained vibration. Without protective armor rods at the tie points, this damage would have occurred to the conductor.

See other side

# HALT VIBRATION WITH Preformed TRADEMARK SVD*

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**Effective way to reduce or eliminate vibration of utility lines**

(Available for use on .250 to .563 diameter line wire)

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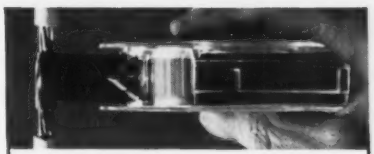
**THIS BRAND-NEW DISPENSER** makes handling plastic electrical tape a revelation! Far safer, too, because the cutter is permanently shielded . . . can't snag hands or clothes.

From beginning to end, you'll save time and trouble with J-M *Dutch Brand* Plastic Electrical Tape in this great new dispenser. And you'll like *all ten* of the big advantages shown on the right.

But, see for yourself! Get all the facts on Dutch Brand® Plastic Electrical Tape in the handy new dispenser from your J-M Dutch Brand Distributor. Or write to Dutch Brand Division, Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ont. Cable: Johnmanvil.



**TEN IMPORTANT ADVANTAGES!**

1. *Permanently shielded cutter!* 2. *No moving parts to snag hands, clothes!* 3. *Can't dull or clog!* 4. *"Tape-and-tear" with one hand!* 5. *Special "grip-strip" for faster starting!* 6. *Full 66' of finest plastic electrical tape made!* 7. *Preloaded . . . ready to go!* 8. *Protects tape against dirt, grease!* 9. *Big center hole for easy handling!* 10. COSTS NO MORE THAN TAPE ALONE!

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DUTCH BRAND ELECTRICAL TAPE

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# NEWS

## Edited for the electrical industry of the West

### General Accord Reached on Coordinating Agreement

Policy-making executives of nonfederal generating utilities have reached general accord with government agency administrators on scope of a coordinating agreement for Columbia Basin power generation.

Utility representatives met recently with Maj. Gen. Alfred D. Starbird, North Pacific Division engineer of the Corps of Engineers, and Charles F. Luce, Bonneville Power administrator.

A group of technical people, mostly chief engineers, will work out specific problems. Coordination will include reservoir release schedules, cooperative use of reservoir space, cooperative scheduling of maintenance, exchanges of energy to insure firm loads and provide for storage of excess energy, and the sharing of the United States obligation to return power and energy to Canada if that country should ratify the Columbia River treaty.

Problems remaining to be resolved include handling of thermally generated energy, cooperative use of transmission facilities, coordination of peaking capacity, interregional questions, limitations imposed on nonpower uses of water and various legal limitations.

Three ex-officio members will attend future meetings. William A. Dittmer, Kaiser Aluminum & Chemical Corp., Spokane, will represent industrial customers. The two others will represent nongenerating utility customers.

### Condemnation Stalemated

Thurston County PUD's program to condemn properties of Puget Sound Power & Light Co. ended in a stalemate recently when Commissioner V. G. Francis announced he would sign no more vouchers relating to the action until the issue is put to a county-wide vote.

Since the death of John Maguire, who favored the condemnation, the PUD has had only two commissioners. Francis and Chairman Harvey Thompson have been unable to agree on appointment of a successor to Maguire.

Since at least two signatures are required on all PUD vouchers, the Francis action means that no money can be paid out without his signature. Unless the two incumbent commissioners can agree on a third, the condemnation action must be deferred at least until after November 1962, when a successor to Maguire may be elected in the regular general election. Thompson, who favors the condemnation, will be up for re-election at the same time.

### Oregon Pulls Out of Compact Negotiation

Failure of Oregon and Washington legislatures to ratify the 16th version of a Columbia Interstate Compact has resulted in Oregon withdrawing its $3,500 annual financial support from the seven-state commission that has been trying to work out an acceptable agreement since 1950.

Idaho, Montana, Wyoming and Nevada legislatures ratified the latest compact proposals — reduced largely to uncontroversial matters— but the two downstream states withheld their necessary approval. Washington delegates said a public vs private power fight on another bill in the Washington legislature had spilled over to affect compact discussions and the bill for approval was tabled. An Oregon legislative committee tabled its bill when it learned of Washington's action.

Despite Oregon's cutoff of its share of funds and decision not to participate further in negotiations, compact commission members from the other six Columbia Basin states said they would continue to meet at intervals. They hope to try again before 1963 legislative sessions.

► **Reports that Peace River Power Development** Co. is planning to abandon plans for northern British Columbia power were denied by W. C. Mainwaring, president. Company directors held a meeting at Vancouver, B. C., recently but, according to Mainwaring, at no time at the meeting or in private discussions was the thought of abandonment of the power project even mentioned.

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### Commission Turns Down Transmission Line Request

The Colorado Public Utilities Commission denied Public Service Co. of Colorado permission to build a 65-mile, 115-kv transmission line from its steam generating station at Cameo to Montrose on the state's Western Slope.

Public Service had asked permission in order to interconnect its lines with those of Western Colorado Power Co. at Montrose. Western is a subsidiary of Utah Power & Light Co.

The unanimous decision said the service being rendered by Public Service in the area "has not been shown to be inadequate and any advantages to be derived from the construction proposed borders on luxury service."

The proposed line would have brought Public Service facilities into the general area where power ultimately will be generated from Curecanti reservoir, a part of the Upper Colorado River Storage Project.

In a separate action, Public Service has filed a petition objecting to Colorado Ute REA, which is building a transmission line in the area to take power from Curecanti.

The Public Service complaint contends Colorado Ute "has wilfully embarked upon a concerted program to parallel and duplicate the transmission lines" of Public Service.

The PSC petition claimed Colorado Ute is a public utility under jurisdiction of the state commission but has not applied for any authority to construct its power line. The commission gave the REA until May 17 to answer.

Among the REAs forming Colorado Ute are two that protested allowing Public Service to build the power line. They are the San Miguel Power Assn. with headquarters at Ouray and Empire Electric Assn. with headquarters at Cortez.

► European-type **"arcade" street light standards** will be installed on several Seattle streets, as the result of action taken by the Seattle city council. The standards, arched aluminum poles spanning the street, have not been used before in the United States. They will be installed on First and Fifth Avenues, North, adjacent to the Century 21 Exposition grounds. Cost of the project is estimated at $98,000.

**This museum piece is in a museum now. The old 1899 Wagner single-phase motor, shown getting a final check from Harold Brumbaugh, foreman at Portland General Electric Co.'s Hawthorne Street service depot, was presented by the company to the Oregon Museum of Science and Industry. Richard Garinger, PGE rural services representative, found it on a farm near Salem. Only four of these antiques, one of the first self-starting motors, are known to be in existence**

## File Damage Suits

The Chelan County PUD, Wenatchee, Wash., has filed a $15 million suit alleging overcharges by six electrical suppliers. The district contends it was overcharged $5,000,000 on hydroelectric equipment purchased from 1954-60 and that it is entitled to the $15 million under treble damage provisions of antitrust laws.

A suit for $5,760,000 was filed in Federal District Court May 8 by the Salt River Project against electrical equipment manufacturers recently sentenced in the antitrust trials. Relating to the purchase of distribution transformers, the suit is said to be the first in a series of actions to be filed by the project against various groups of electrical manufacturers.

► **Grant County PUD's** annual report for 1960 has been awarded first prize by the American Public Power Assn. for "excellence in presentation of editorial, statistical and graphic material in an annual report covering public owned electric utilities operation and management for public power systems in the nation having gross annual revenues of from $1 million to $5 million." E. B. Gibbons, PUD manager, received notice of the award May 1.

## Springfield Votes Again On Acquisition Proposal

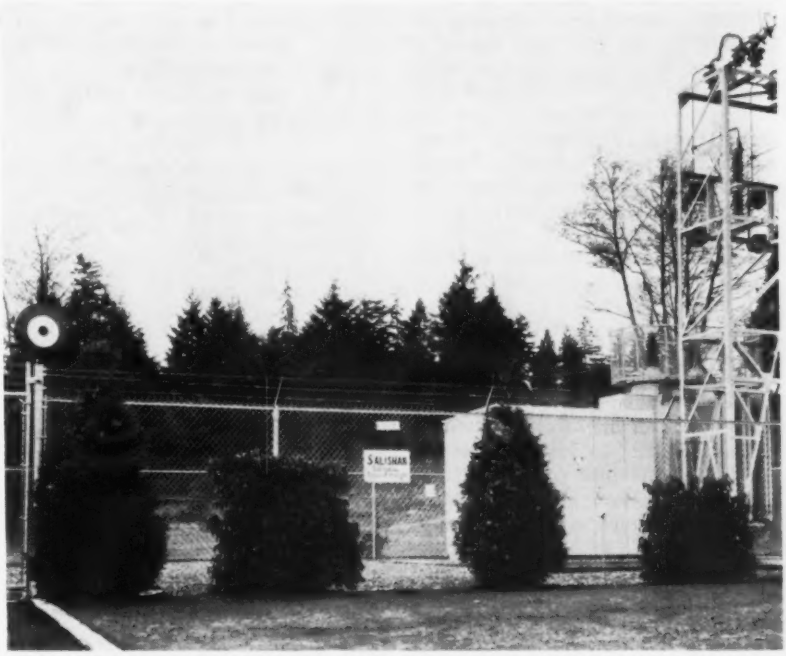
The Springfield city council has set June 28 for a special election on a $3.9 million bond issue to finance acquisition of Pacific Power & Light Co.'s facilities in the area.

On Nov. 4, 1958, Springfield voters defeated a $3.5 million revenue bond issue for the same purpose.

► Commemorating its 75th anniversary, **Arizona Public Service** Co. has published Dawn on the Desert, a 42-page history of the utility. Specially bound copies were presented to every library in the state.

► A plan to move **Montana Power Co.'s corporate home to Montana** will be placed before company stockholders at their annual meeting on June 21. Board members have approved the filing of articles of incorporation of the Montana corporation with the secretary of state in Helena. The change, which would involve a merger of the Montana corporation with the New Jersey company, organized in 1912, also requires approval of regulatory agencies.

**PGE Vice President Hilbert Johnson, right, and Portland City Commissioner Ormond R. Bean chose a showery day to inspect the rehabilitation job the utility is doing on Portland's downtown ornamental lamp system. Besides painting and refurbishing the standards, the old pairs of 6,000-lumen incandescents are being replaced by 20,000-lumen mercury vapor color corrected lamps. The job was planned to touch up Portland streets for the Rose Festival in June**



**BULLSEYE: Although it looks small in this picture, the target mounted on the fence at left is proving an acceptable substitute for substation insulators, which formerly were constantly broken by rock-throwing Tacoma boys on their way to and from school. Formed from the end of a steel oil drum and brightly painted, it is a satisfactory noise maker when hit. Before its installation at direction of Ralph R. Thomas, electrical operations supervisor for Tacoma City Light, insulators were broken on an average of one a week. No insulator breakage has been reported since the target was installed. The device is being copied in other city substations vulnerable to "boy attack"**

**The new $5,000,000 neutral sulfite process paper mill of the Menasha Wooden Ware Corp., built on sand dunes across Coos Bay from North Bend, Ore., was scheduled to begin operation by mid-May. Construction of the 125-ton-daily plant was made possible by PP&L's development of a method of tapping water reserves stored in the dunes**

## Utility Project Recovers Fresh Water From Oregon Dunes

Pacific Power executives saw the beginning of the pay-off for their $500,000 venture into scientific water witching in the sand dunes of the Coos Bay area recently, when they participated in dedication ceremonies for the $5 million paper mill of the Menasha Wooden Ware Corp.

Pacific's six-year scientific investigation and engineering directed at recovering fresh water known to be held in the dunes led directly to Menasha's decision to build the 125-ton-a-day plant. Pacific will supply both water and power for the operation, which is expected to provide about 100 new jobs in its Coos Bay-North Bend service area.

There's plenty more water left, and other mills may follow. Pacific's President D. R. McClung reports the dunes near the new paper mill are capable of producing 30,000,000 gal daily. Since Menasha will take only 1,500,000 gal from six wells, there is ample water for additional industrial expansions.

Pacific Power set about the task of finding a water supply after acquiring the Coos Bay electric service area in 1954 upon merger with Mountain States Power Co. The company's studies of industrial growth potential had revealed the timber-rich Coos County produced tons of residue wood fiber at large scale lumber mills.

Converting the raw materials into pulp and paper and other wood-fiber products would require millions of gallons of fresh water. PP&L engineers set out to find it.

Deep wells were first drilled close to the industrial areas of North Bend and Coos Bay. Later the engineers turned to the north shores of the bay and the miles-long dune area where small lakes hinted of a high water table in the sands.

Field surveys proved the deep dunes piled near the ocean held rainwater as a sponge holds liquid.

Four years of extensive tests followed. The research showed that 13,000 acres near the bay held a reservoir of 152 million gal of rainwater. With an average annual rainfall of 65 in., the 100-ft-deep dunes area absorbs a daily average of 50,000,000 gal of rainwater. This amount then spills to the ocean with the ebbtide.

► The Colorado Public Utilities Commission was given jurisdiction over rural electric associations in a bill signed by Gov. Steve McNichols. The measure authorizes the PUC to decide disputes over territory involving rural electric cooperatives as well as private power companies. As passed the measure was a compromise with both investor-owned utilities and cooperatives agreeing to it.

## Financial Notes

FPC has authorized **Sierra Pacific Power** Co. to issue 795,416 shares of common stock, par value $3.75 per share, to effect a reclassification and stock split. The utility will increase its 795,416 outstanding shares of common, par value $7.50 per share, to 1,590,832 shares, $3.75 par value. Shareholders will receive one new share for each share held.

**Idaho Power** also is proposing a stock split. It has filed application with FPC to issue 3,075,000 shares of common stock, par value $5 per share, to holders of its outstanding common, par value $10 per share.

The Wyoming Public Service Commission has authorized **Montana-Dakota Utilities** Co. to issue 50,000 shares of $100 par value stock to 15 insurance companies at a private sale. Deducting brokerage fees and other sale expenses, the company expects to net $4,950,000, which will be used to retire $2,500,000 in short-term notes and partially finance its 1961 construction program.

An investment banking group headed by Dillon, Read & Co. and Dean Witter last month offered $12 million of **Hawaiian Electric** Co. 4.65% first mortgage bonds, series L, due April 1, 1991, priced at 100%. Proceeds from the sale will be applied towards costs of construction including repayment of $1,000,000 in bank loans secured for this purpose. With the sale of the new bonds, capitalization of the company will consist of $57 million in first mortgage bonds, $20,256,880 in cumulative preferred stock, and 1,048,163 shares of common.

**Arizona Public Service** Co. has filed a registration statement with SEC covering 488,986 shares of its common, par $2.50. It will offer holders of its outstanding common stock rights to subscribe for the additional shares at the rate of one new share for each 15 held on May 23. A group of investment firms jointly headed by the First Boston Corp. and Blyth & Co. will underwrite the offering.

**Tillamook County PUD** has sold $4,400,000 in revenue bonds to Smith, Barney & Co. of New York City at an effective interest rate of 4.05%. Voters authorized the issue last September for acquisition of PP&L's distribution and transmission facilities in Tillamook County.

**El Paso Electric** Co. has filed with FPC for a proposed two-for-one common stock split. This would give the company 4,247,842 shares of no-par-value common stock. At the same time it would increase its authorized common stock to 5,000,000 shares.

## Council Curtails Operation

Decision of the Puget Sound Utilities Council not to replace Jack D. Stevens, who resigned March 31 as its principal staff officer, is viewed by some Northwesterners as an indication that the agency is near dissolution.

Stevens had served the council as consulting engineer since its formation seven years ago by Puget Sound Power & Light Co., Seattle and Tacoma City Light, and the Snohomish and Chelan County PUDs. Other engineering commitments made it impossible for him to continue, he said.

The council's principal activities were in developing a pooling program for exchanges of power and in conducting an active industrial promotion program.

Tom Quast of the Snohomish County PUD, council chairman, denied that legislative battles during the past two years had anything to do with the decision to curtail operations. Each utility is conducting industrial promotion programs, he pointed out, and other regional groups provide necessary coordination. Pooling arrangements can be handled directly by the utilities until more complete coordination between all Northwest utilities is effected as a preliminary toward implementation of the U. S.-Canadian power treaty, he declared.

The council has closed its Seattle office but plans to hold bimonthly meetings, Quast said.

## CMUA Branches Out

The California Municipal Utilities Assn. has selected Norman E. Woodbury, an attorney and mayor of the city of Davis, Calif., as its first executive director. He will establish an office in Sacramento for the CMUA.

Ralph Foy, president of the association, stated that it has grown during its 29 years in such size and importance a full-time executive director is necessary to serve properly the interests of its members; to further develop a program for the accumulation and dissemination of information on matters of public utility operation and to represent the interest of municipally owned utilities in legislative matters.

CMUA was first organized in 1933 and is comprised of 53 city and special district utilities systems, including municipally operated water, electric and gas utility services.

Woodbury's appointment was effective May 1. With offices in Sacramento, he will be close to Ken Davis, Sacramento Municipal Utility District legal counsel, who recently was named attorney for CMUA.

**THE WESTERN UNDERGROUND COMMITTEE met in Modesto, Calif., May 5 and 6. One of the subjects considered was the surface-mounted transformer. Shown above, Ed Hanson of General Electric describes his company's approach to this design type. Other subjects discussed were: paper lead cables; epoxy termination and splicing; resin-type potheads and joints; overvoltage and overcurrent protection; and a follow-up discussion of the Electrical West article on encapsulated transformers. Next meeting of the Western Underground Committee is scheduled for Burbank, Calif., in September**

► **Pacific Gas and Electric Co.** will begin work this summer on establishing a number of new public camping and picnic areas on Lake Spaulding and the Mokelumne River, according to S. L. Sibley, vice president and general manager. The project is part of a PG and E program to develop more recreational facilities on lands in the company's hydroelectric watersheds. When completed, the new recreation areas will be open to the public free of charge. Last spring PG and E completed and opened to the public picnic areas on three other power reservoirs.

► Eastern Oregon Electric Cooperative has **refused to withdraw from an area that wants to be annexed to the city of Pendleton,** Ore. The city council has ruled it will not annex an area served by an electric utility other than one holding a franchise with the city and Pacific Power & Light Co. holds the city franchise. The area is site of a 24-unit apartment and a new hospital.

## Power Dispatchers Meet

J. L. Price of Southern California Edison Co. was elected president of the American Power Dispatchers Assn. at its national spring meeting in Phoenix, April 28-29.

Other officers elected were J. T. Morcom, Salt River Power District, vice president; R. H. Renfro, Southern California Edison, secretary; C. M. Merrell, City of Glendale, treasurer.

On the second day the group was taken on a conducted tour of the Inspiration Consolidated Copper Co. mine at Miami, Ariz.

Reporting the event, Arthur E. Hill of Long Beach commented:

"It was most interesting to see 25-cycle-per-second power in use. I believe this is the only 25-cycle power in the West and the 100-mile, 110-kv loop serves mining load in the mountains of Arizona. Generators located at Roosevelt Dam generate at 25 cps but, since this source is inadequate to carry the peak demands, 60/25 cycle frequency changers located at Mesa substation supply the difference."

## GROWTH

### Northwest Tie Line

Washington Water Power and Pacific Power & Light will build a 230-kv transmission line from the Lolo substation at Lewiston, Idaho, to Priest Rapids and Wanapum Dams on the Columbia River near Vantage, Wash.

Marshall L. Blair, WWP vice president, said each company will build a section of the 200-mile line and the entire project will be completed in the summer of 1963.

He said WWP will start construction of a 40-mile section from Lewiston to the Garfield County (Wash.) border.

Blair noted that WWP and Idaho Power Co. already have completed a 230-kv line from Lewiston to Brownlee Dam on the Snake River. This link, Blair said, made effective an agreement to coordinate the resources of the two utilities. When the new Lewiston-Wanapum line is completed, the coordinated agreement will extend to all three utilities.

### Los Angeles Projects

Authorizations of five new power projects totaling $4,804,000 were announced by the Los Angeles Board of Water & Power commissioners.

Approximately one-half of the proposed expenditures will go for a new bulk power receiving and switching station to be built in the downtown area to increase the amount of power available to serve the many new office buildings and other expansions taking place there. This part of the newly authorized construction program will amount to $2,419,000, it was stated.

General manager and chief engineer Samuel B. Nelson said the projects just authorized by the board are part of the $80 million construction work scheduled to be done this year by the city utility.

### SMUD Awards

The Sacramento Municipal Utility District will award some $10 million worth of construction contracts this spring and summer for its upper American River hydroelectric development. This was reported to the district's board of directors by Paul E. Shaad, SMUD general manager and chief engineer.

"First power from the Upper American River project is now scheduled to come on the line during May or June from the first of two generating units at Jaybird power house, northeast of Pollock Pines, depending on equipment tests," Shaad told the board in a progress report.

"It will be a year before another generating unit at Jaybird will be ready for operation. In the meantime, six construction contracts, including the installation of this second Jaybird unit, are to be awarded. These contracts will total more than $10 million. Three of them will be for starting work on the project's higher elevation features in the Loon Lake area," Shaad said.

### Don Pedro Study

Bechtel Corp. has been selected for the design and engineering management of the proposed $80 million Don Pedro Dam on the Tuolumne River in central California.

Bechtel contract is on a "cost plus" basis, and is expected to run approximately $3,000,000.

Actual construction of Don Pedro Dam is contingent upon bond authorization elections set for this fall. Voters in Modesto and Turlock Irrigation Districts will vote in September on the measure, and San Francisco voters will find the Don Pedro project as part of a $115 million bond issue on the November ballot.

Bechtel is expected to do approximately $300,000 worth of work on the project between now and November, which amount will be paid out of existing funds.

### Alaska Hydro

Chatanika Power Co. Inc. of Fairbanks, Alaska, has filed an application with the Federal Power Commission seeking a 24-month preliminary permit for a proposed hydroelectric project on the Chatanika River in Alaska.

Chatanika proposes to construct an earthfill dam about 130 ft high and 1,200 ft long located about three-fourths of a mile downstream from the mouth of Shovel Creek. **The dam would have a permanent artificially frozen core and cutoff to provide the impervious barrier.** A power house would have an installed capacity of 15,000 kw. The preliminary estimated cost of the project is $8 million.

► The Snohomish County PUD has approved an agreement with the U. S. Forest Service for multipurpose development of the Sultan River, to provide water for Everett and power for the PUD.

**Crew from Selby Drilling Corp., Boise, is core drilling for foundation at site of Bruces Eddy Dam on the north fork of the Clearwater River in northern Idaho. Drill rig was stationed 60 ft up rocky hillside when this photograph was taken**

# WASHINGTON REPORT

## Intertie Report

A preliminary report on the feasibility of the Bonneville-California intertie, requested by Interior Secretary Stewart Udall, shows there is a long way to go in planning before the line can be a reality. Udall had requested Bonneville Administrator Charles Luce to head a five-man task force to study the intertie, and to report to Udall by May 1. This preliminary report, somewhat delayed, indicates there are more problems than Udall had anticipated.

The task force has asked for about six more months to complete its study. It says that a line is feasible, but it isn't ready to say just how the line should be built.

It's understood that the task force found two problems with the special report, prepared by H. Zinder & Associates for California Gov. "Pat" Brown: (1) the big, twin 500-kv line was somewhat unstable electrically and needed support toward the center of its great length; (2) there's a question of whether lower Californians would pay for power at the rate required by Zinder's proposed intertie – in the face of possible steam-generated power costing 3.6-3.7 mills.

## Mountain Sheep-Nez Perce

FPC presiding examiner William Levy turned down a request by the Washington Public Power Supply System (Nez Perce Dam applicant) to amend its license application to include the High Mountain Sheep project as an alternative, in the event the FPC turns thumbs down on Nez Perce.

Pacific Northwest Power Co. presently is applying for the High Mountain Sheep site, but the Washington group cites the Federal Power Act, Section 7, as giving public bodies preference to hydro-power sites over private bodies, and they hoped to "cover the waterfront" with the amended application. Levy ruled, however, that WPPSS was too late in requesting the amendment—that he would decide between the two present applications on their merits. He turned the matter over to the full commission, however, for their ruling.

Final rebuttal arguments in the case are set for June 22. After that, Levy will study the lengthy hearings, which began last November, and make his preliminary report. This will be given to the full commission for their order at a later date.

A likely action by the FPC, soon to be democratic-dominated, would be the postponement of any action on either of the two license applications until the end of 1964, when the Interior Department hopes to complete a crash study of migratory fish problems at high Northwest dams—like Nez Perce. Interior Secretary Stewart Udall asked the FPC to hold off on the present case unless such a study were made, but Kuykendall never answered him. Democratic control probably would permit the FPC to vote to postpone.

## Resources Council

A basic policy fight has shaped up in the White House and on Capitol Hill over President Kennedy's plans to expand the budget bureau's control over the administration's natural resources planning.

Sen. Clair Engle (D-Calif.) and Sen. Gale McGee (D-Wyo.) had introduced similar legislation to establish an independent resoruces advisory group in the White House—and hearings were held by the Senate interior committee earlier this year on these bills. Engle, McGee and other Senate Democrats are displeased, therefore, over the President's plans to by-pass the independent group for more budget bureau control.

The President's plans are spelled out generally in a budget request he has submitted to the House appropriations committee, calling for an added $190,000 to hire 10 more natural resources advisors in the budget bureau, and to hire probably four or five more liaison personnel on natural resources in his existent council of economic advisors. Kennedy is doing away with the public works and natural resources planning coordination office, headed by Gen. John Bragdon under former President Eisenhower. This group had been paid out of special presidential funds.

A total of 33 Senate Democrats had sponsored the Engle and McGee bills – many of them relying on democratic campaign statements that the White House resources council should be created—and they are now wondering why the President has left them in the air, taking a more conservative course than his campaign promises.

The senators plan to sit back, however, and see how the Kennedy plans fare in the House and Senate appropriations committee. They may proceed with hearings, and finally approve the Engle or McGee legislation anyway. What they do depends largely, at present, on congressional reaction to the Kennedy budget request.

## FPC Nominations

Federal Power Commission nominees Joseph Swidler (former TVA general counsel) and Howard Morgan (former Oregon public utilities commissioner) won approval from the Senate commerce committee, and were awaiting almost certain approval from the Senate floor, as ELECTRICAL WEST went to press.

Opposition against Swidler and Morgan had developed on three grounds: "public power prejudice" charges that Morgan had failed to reveal two early arrests when he first applied for federal employment, resentment by oil and gas interests that neither of the two nominees was oriented toward petroleum problems in the Southwest —rather, both are oriented toward power issues.

Meanwhile, legislation to revise or strengthen the federal regulatory agencies is being considered on Capitol Hill. Rep. Oren Harris (D-Ark.) has introduced legislation to increase the Federal Power Commission to seven members – compared to its present five – and Sen. John Carroll (D-Colo.) has introduced three bills to publicize all ex parte contacts with FPC commissioners and to lengthen all commissioners' terms to 10 years.

The Carroll legislation would permit the President to remove one member of the FPC, at his discretion, to be replaced by a member of his party when he comes to office.

The big question in Washington, however, remains on what the present FPC chairman, Jerome Kuykendall, will do. He is legally entitled to remain as chairman until his term expires in June 1962, but the political realities will make this very difficult once Kennedy gets democratic control of the commission this month. FPC Commissioner Arthur Kline leaves office June 22, and this will permit the president to name his third Democrat to the FPC, tipping it away from the Republicans for the first time since President Eisenhower was in office. If Kuykendall stays on as chairman, he will be in the unique position of being in the minority.

## MARKET DEVELOPMENT

**Dale Veatch of California Electric Works and Jack Hacker, San Diego Gas & Electric Co., Contractors Division coordinator, look at suspended ceiling, put up for the show. Note ribbons at far left, used to show how fans can be combined with lighting in the ceiling installation. This exhibit, made possible by industry cooperation, was a bureau first**

### Spring Fair at San Diego Gives Business a Needed Boost

Although immediate sales may have fallen below previous records, long-range benefits of the San Diego Spring Fair cannot be discounted. That was the general belief expressed by exhibitors as they tore down their booths following the six-day show sponsored by San Diego Bureau of Home Appliances at Balboa Park. Accomplishment was tremendous in view of slow economic conditions, they said, and predicted that effects of such a promotional "shot in the arm" would be felt until the next show.

The public turned out in numbers to see the Fair of Modern Home Ideas and they liked what they saw. Contributing to this industry and public satisfaction were three special exhibits arranged by bureau divisions.

In addition to the Parade of Kitchens, expanded this year by the Kitchen Division, a Weather World of Air Conditioning was featured by the new Air Conditioning Division and lighting was given a prominent place in the building occupied by the Contractors Division.

One of the spectacular displays from the standpoint of the industry was an integrated illuminated ceiling put up in a cooperative venture to save this business for electrical contractors (who are in danger of benig pushed aside by so-called ceiling contractors offering packaged installations.)

Conceived last February by a group of lighting people at a Contractors Division luncheon, the idea for the ceiling exhibit was made a reality through the cooperation of IBEW, NECA, NAED and San Diego Gas & Electric Co. These organizations, with the bureau and the manufacturers, contributed manhours, provided a foreman, furnished the structural supports and gave the space. The result was a 20x43-ft ceiling containing equipment of 10 lighting manufacturers. Decorative possibilities were shown in the varied designs and colors. "Today's Work Requires Modern Lighting," slogan of this exhibit, was elaborated by those who manned the desks below it.

For the homeowner also there was effective lighting promotion. Stripped of the appliances and other details, which formerly tended to distract attention from the lighting itself, the displays gave viewers plenty to look at and to fiddle with. Individual niches showed features and advantages of TV lighting; pull-down fixtures (with the proper installation methods); garden lighting; lighting of indoor plants and planters; under-cabinet lamps; cove, cornice and valance lighting; dimmers, switches and wall plates recently put on the market. Sales messages with these exhibits followed the wording of ads run by the bureau and the utility.

An outdoor display, including use of black light in gardens, proved so popular that viewers left the graveled paths and walked through the dust to get a closer look.

Signs throughout the exhibit read "available through your electric contractor."

#### Air Conditioning

The building completely air conditioned by participating manufacturers should go a long way toward educating the public that is just beginning to realize that nature doesn't do it all. A side benefit of this undertaking, a first in bureau shows, is the opportunity it provided to bring together air conditioning and heating contractors and electrical contractors.

Entered through an invisible air curtain, the Weather World of Air Conditioning included entertainment features that carried a subtle sales message. Those who heard the weather broadcast and saw the special weather bureau equipment learned that humidity and other factors play a part in the comfort index. A Minneapolis Honeywell display showed results in comfort and labor saving when an electronic air cleaner is installed in the duct works of a heating or air conditioning system.

Some 11 manufacturers displayed equipment for heating and cooling. Heat pumps were well represented in the display. Among the gimmicks brought in to attract the public was the forerunner of the electric fan, now a museum piece. Operated by heated air, this kerosene fan was insured for $25,000 during the show.

#### Kitchen Parade

Expanded to twice the area previously occupied, the Parade of Kitchens included 11 exhibits by kitchen designers. The rules were

**Another first, the Weather World of Air Conditioning, was a building completely air conditioned by participating manufacturers. Fred A. Clarke, San Diego G&E, division coordinator, directed the installation. Below, Light for Living exhibit**

relaxed this year to give greater latitude in booth design. Many were without ceilings and different heights were permitted. Built-ins held the stage with particular public attention going to an electronic range, a built-in wall refrigerator and a barbecue-broiler. The more enterprising dealers showed ingenuity in furnishing their booths and adding accessories for a homelike look. Again this year the cooperating dealers helped each other to improve the over-all display.

Gone were the long rows of free standing major oppliances. Although these units were shown in several displays throughout the fair, the emphasis this year was on the built-ins. That seemed to be what the public wanted.

TV and hi-fi, represented in half a dozen displays, was also less prominent than in the fall when distributors and dealers are readying for the Christmas trade.

Probably the most popular man at the show was Astro Robot, a 9-ft-tall electronic marvel built in 1929. Astro moved, talked, smoked, to the delight of young and old. He can shoot a gun but he was not allowed to do so. An exhibit hall that is visited by almost 150,000 persons during a five-day show is not a proper shooting gallery, the sponsors decided.

► **Evalyn Vaughan,** San Francisco Division home economist, Pacific Gas and Electric Co., has been transferred to Stockton as the company's home economist in that area. Her position in San Francisco will be taken by **Louise Fletcher,** who was formerly with G-E Supply and more recently has been with Safeway.

## Better Copy Contest Winners

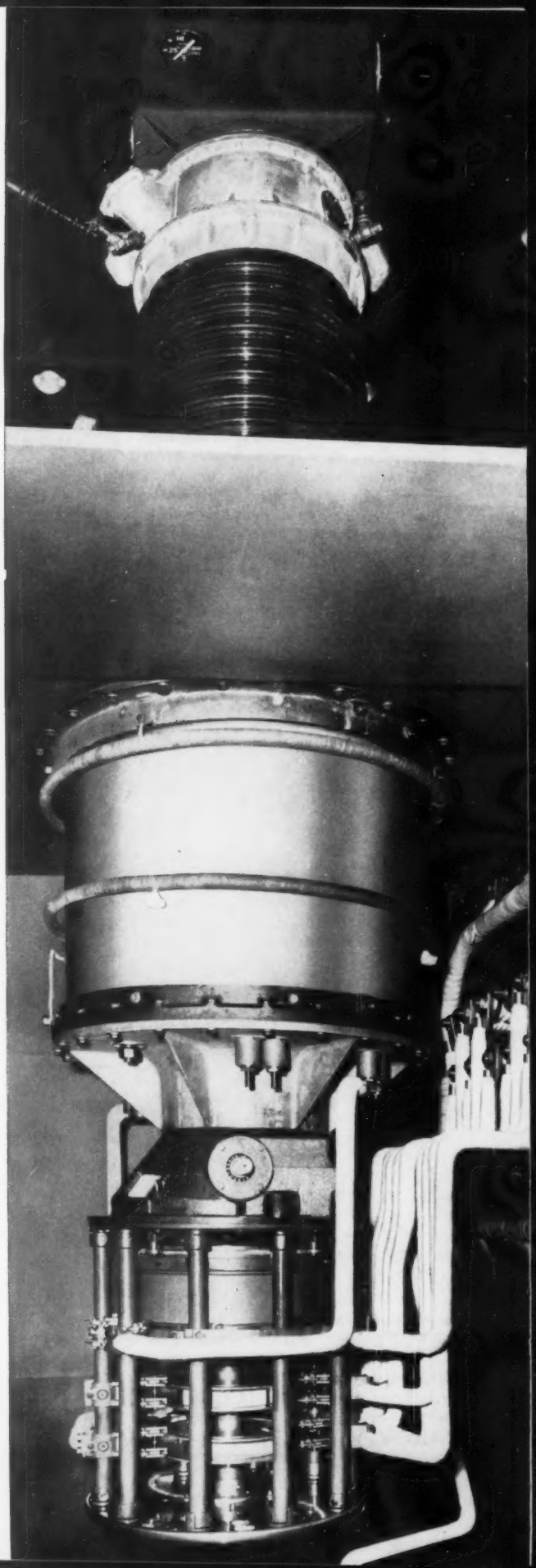
Ten Western utilities were among winners in the Public Utilities Advertising Assn.'s Better Copy Contest.

Firsts were won by B. C. Electric for a single ad promoting use of service; Hawaiian Electric, annual report; Idaho Power for employee newspaper; Pacific Gas and Electric, single ad on public relations subject, promotional material to dealers or builders, employee magazine, TV advertising; Southern California Edison, a complete program; Southwestern Public Service, annual report.

Second prizes were won by Pacific Power & Light, two categories; Portland General Electric; Southern California Edison. Third prizes went to Hawaiian Electric, two categories; PG and E; PGE; Public Service of Colorado; Washington Water Power.

► **A freezer that fits directly under 40-in. ranges** such as the Frigidaire Flair or Tappan 400 has been developed by King Refrigerator Corp. Using space available because this type of range is built off the floor, the King 399 has two pull-out freezer baskets, a full-size refrigerated shelf and storage on both doors. Use of a special fan makes it possible to install this freezer flush to cabinets and walls on all sides. The unit acts as a base cabinet as well as a freezer.

# new URH high-voltage load tap changer on 200 mva transformer reduces weight 10%, length 25%, losses 15%



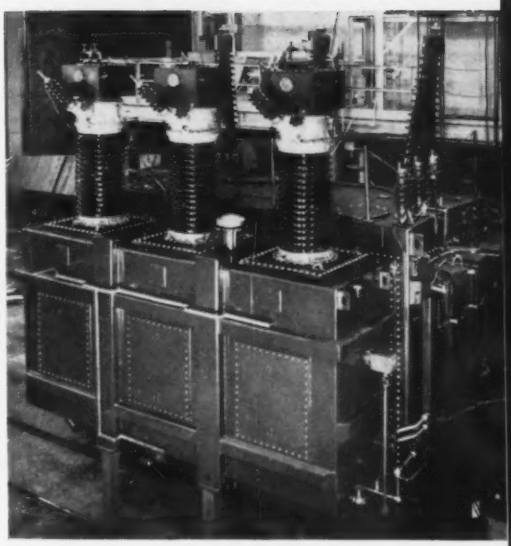
Here is how to reduce shipping weight and size, and improve efficiency, in high-voltage power transformers.

The new Westinghouse URH High-Voltage Load Tap Changer is designed for line voltage operation; eliminates the need for a series transformer. It also eliminates the preventive auto-transformer. Instead, a transition resistor is used, keeping current and voltage in phase for better arc interrupting conditions.

Its in-phase resistance-type transfer switching contributes to extra long contact life.

It's always on position, no matter where it stops in a tap change cycle.

With the new Westinghouse URH High-Voltage Load Tap Changer, the 200 mva transformer shown here has been reduced in weight, size and losses as compared with units utilizing conventional high-voltage load tap changing equipment. You can make similar savings on other sizes of Westinghouse power transformers. Ask your Westinghouse representative for details; or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.



**This 200 mva Westinghouse transformer** is the largest in the U.S. with resistance-switched high-voltage load tap changer. Shown on test, it is now installed at the Gardenville, N.Y., station of the New York State Electric and Gas Corporation to step down voltage from 230 to 120 kv. J-70955

YOU CAN BE SURE . . . IF IT'S **Westinghouse**

*For phone number of closest representative see advertising index in back of book.*

The *right* extension cord is essential for safe, dependable operation of on-the-job equipment and temporary lighting . . . the *right* size to carry the load, the *right* length to supply the power without voltage drop. That's why there's a Royal heavy-duty POWR-KORD to fit *every* job. Available in one quality (the very best) . . . two types (rubber and vinyl) . . . three colors (red, black, yellow) . . . four wire sizes (12, 14, 16, 18) . . . and over five handy cord lengths (10 to 100 ft.). See your wholesaler. He has the facts — and Royal POWR-KORDS in stock, ready for your work.

ROYAL ELECTRIC ... an associate of LTV

ROYAL ELECTRIC CORPORATION
PAWTUCKET, RHODE ISLAND

In Canada:
Royal Electric Company (Quebec) Ltd., Pointe Claire, Quebec

**SALES REPRESENTATIVES AND WAREHOUSES:** Los Angeles—1950 Naomi Avenue, RI 7-9655; **San Francisco**—1225 Sixth St., HE 1-5792; **Seattle**—4130 First Ave., So., MA 3-8882; **Phoenix**—221 E. Camelback, CR 7-1662; **Denver**—110 Yuma, SH 4-1351

# NUCLEAR NEWS

## Mobile Low Power Reactor

The Mobile Low Power Reactor No. 1 achieved criticality on March 30, 1961, making it the 29th reactor to be brought to a sustained chain reaction in the 11-year history of the AEC's National Reactor Testing Station in Idaho.

The startup was another step in the joint development by the commission and the U. S. Army Corps of Engineers of a small mobile nuclear power plant and power conversion system to meet an Army requirement. The next step will be the coupling of the reactor with power conversion equipment consisting of a gas turbine-generator capable of producing 300 to 500 electrical kw.

This plant, which is being designed and built for the commission by the Aerojet-General Corp., Azusa, Calif., is the world's first direct and closed-cycle gas-cooled nuclear power system. In this system nitrogen gas, heated in a water moderated reactor core, is used to drive the turbine, then is returned to the core.

The entire plant is skid-mounted in six packages totaling less than 38 tons and can be transported by standard Air Force cargo aircraft, truck-trailer, train or barge.

## New Element Discovered

Discovery of an isotope of element 103 has been announced by a team of scientists at the Lawrence Radiation Laboratory operated for the AEC by the University of California.

The Berkeley researchers have suggested the name Lawrencium for the new element in honor of the late Ernest O. Lawrence, Nobel prize winner, inventor of the cyclotron and founder of the laboratory that now bears his name.

The discovery was made by nuclear chemists Albert Ghiorso, Torbjorn Sikkeland, Almon E. Larsh and Robert M. Latimer of the Lawrence Radiation Laboratory.

The scientists performed their experiments with the heavy ion linear accelerator, one of the major tools of nuclear research at the laboratory.

According to one scientific theory, element 103 is a "dinosaur" of matter, which was formed at the birth of the universe, but decayed out of existence in a matter of weeks following creation. The half-life (the period in which half of a given quantity of an isotope will decay into another element) of the 103 isotope

was determined to be about eight seconds.

The discovery of element 103 shows no promise of direct practical application, but will broaden man's fundamental understanding of matter and its properties.

## Radioactive Wastes in Glass

Scientists of the British Atomic Energy Research Establishment at Harwell, England, are developing a new method of storing highly radioactive waste, which is expected to simplify the process.

Laboratory work has shown that it may be possible to store these waste materials quite safely by converting them into insoluble glasslike solids.

The glass solid is produced by making a slurry of silica and borax in a nitric acid solution of the concentrated liquid wastes. This, when evaporated to red heat, sinters and melts, and on cooling solidifies to a glass of chosen composition. A typical product might contain from 20-30% by weight of waste oxides.

Experiments have shown that the properties of the glass remain substantially unchanged when samples are subjected to a radiation dose equivalent to the dose received by a glass incorporating high activity waste stored for 500 years.

## Molten Plutonium Reactor

The Los Alamos Molton Plutonium Reactor Experiment No. 1 achieved criticality (sustained chain reaction) on April 3, at the Atomic Energy Commission's Los Alamos scientific lab in New Mexico.

The small experimental nuclear reactor with a design power level of 1,000 tkw uses a molten alloy of plutonium and iron as the fissionable fuel. The experiment is part of the plutonium fuel development program for exploring the unique molten alloy fuel. The molten alloy fuel approach could be applied to the development of fast breeder reactor concepts. A fast breeder reactor can produce power and at the same time create more fissionable fuel than it consumes.

The fuel region, or core, of the reactor is about six inches high and six inches in diameter. Heat is removed from the fissioning fuel by a circulating stream of molten sodium. An air radiator is used to cool the primary sodium. Operating temperature of the experimental reactor is about 950 F.

## Organic-Cooled Plant

The AEC is inviting cooperatively and publicly owned utilities to submit proposals for participation in a prototype 50,000-ekw nuclear power plant project incorporating an organic-cooled and moderated reactor. The proposed plant, scheduled for completion by winter 1964-65, would be built under the commission's power demonstration reactor program.

The invitation is being issued because an evaluation of nine expressions of interest received from utilities in response to a commission invitation last December indicates a reasonable likelihood that an acceptable proposal will be received. Of the nine organizations responding, four who submitted expressions of interest considered to be responsive and which are being specifically invited to submit proposals are:

Burlington Light Department, Burlington, Vt.; Dairyland Power Cooperative, La Crosse, Wis.; Grand River Dam Authority, Vinita, Okla.; Plains Electric Generation & Transmission Cooperative, Albuquerque, N. M. The commission's advisory committee on reactor safeguards has concluded that each of the sites proposed is acceptable for the location of a reactor of this general type.

Under the terms of the invitation, the participating utility would be expected to provide, as a minimum, the site and conventional facilities, to operate the entire plant for at least five years and to purchase steam from the reactor. The nuclear steam supply system including the reactor would be financed principally by the commission.

## Gas-Cooled Reactors

Corwin L. Rickard of General Dynamics Corp.'s General Atomic Division presented figures to the American Power Conference on March 22, showing that more gas-cooled nuclear power plants already are in operation, under construction or in the process of development than any other type.

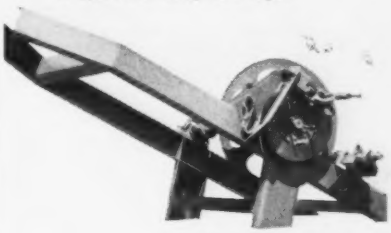
Of some 6,700,000 kw of nuclear plant capacity built, building or contracted for in various parts of the world, gas-cooled, graphite-moderated plants account for nearly two-thirds (4,452,000 kw).

This is due in large measure to the extensive gas-cooling programs of Great Britain and France, but gas-cooled nuclear power stations also are planned or are presently being built in Italy, Japan, Germany and, of course, in the United States.


**Now—Convert your own Reel Dolly to a Bullwheel Tensioner WITH A PENGO 5000-U Assembly**

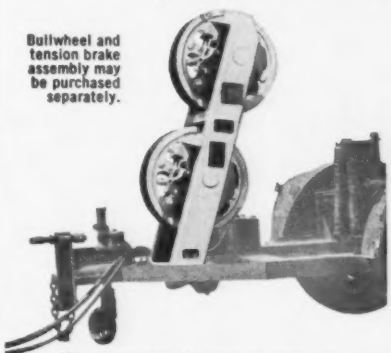
5000-U assembly installed by City of Medicine Hat, Alberta, Canada.

Here's an easy way to build up a modern bullwheel tensioner at low cost—simply install a PENGO 5000-U Bullwheel Assembly to your old trailer or reel dolly. You'll have a tensioner with Neoprene-lined 26" bullwheels, capable of handling practically any distribution line stringing job at tensions to 2,000 lbs. at up to 4 mph.



Support arms, reel spindle with reel brake, and hand rewind assembly. 2⅝" spindle will handle reels to 75" diameter, 44" width unless reduced to fit your trailer.

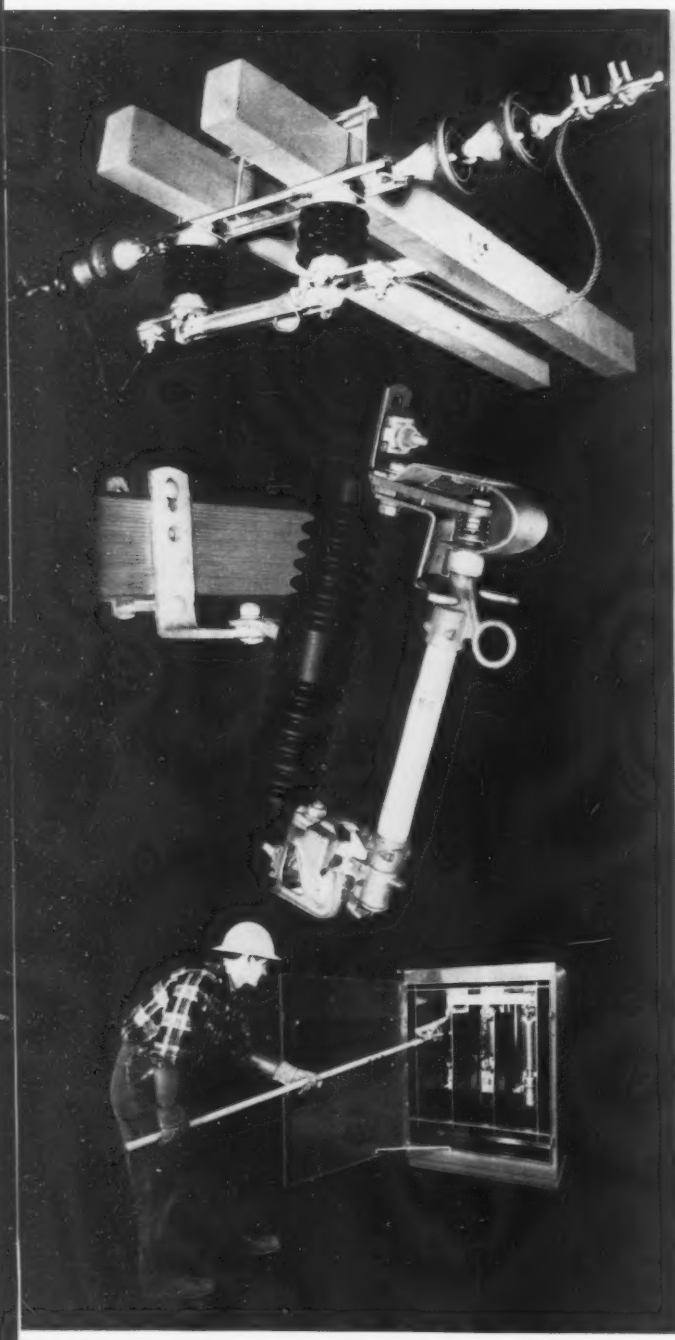
Bullwheel and tension brake assembly may be purchased separately.



*We invite you to write or wire for literature, prices—please address Dept. 34.*

PETERSEN ENGINEERING COMPANY, INC.
Santa Clara, California
16 Phone: AXminster 6-7712

# Loadbuster works with all four



## Portable loadbreak tool is usable with cutouts, disconnects, power fuses, and pad mounted gear

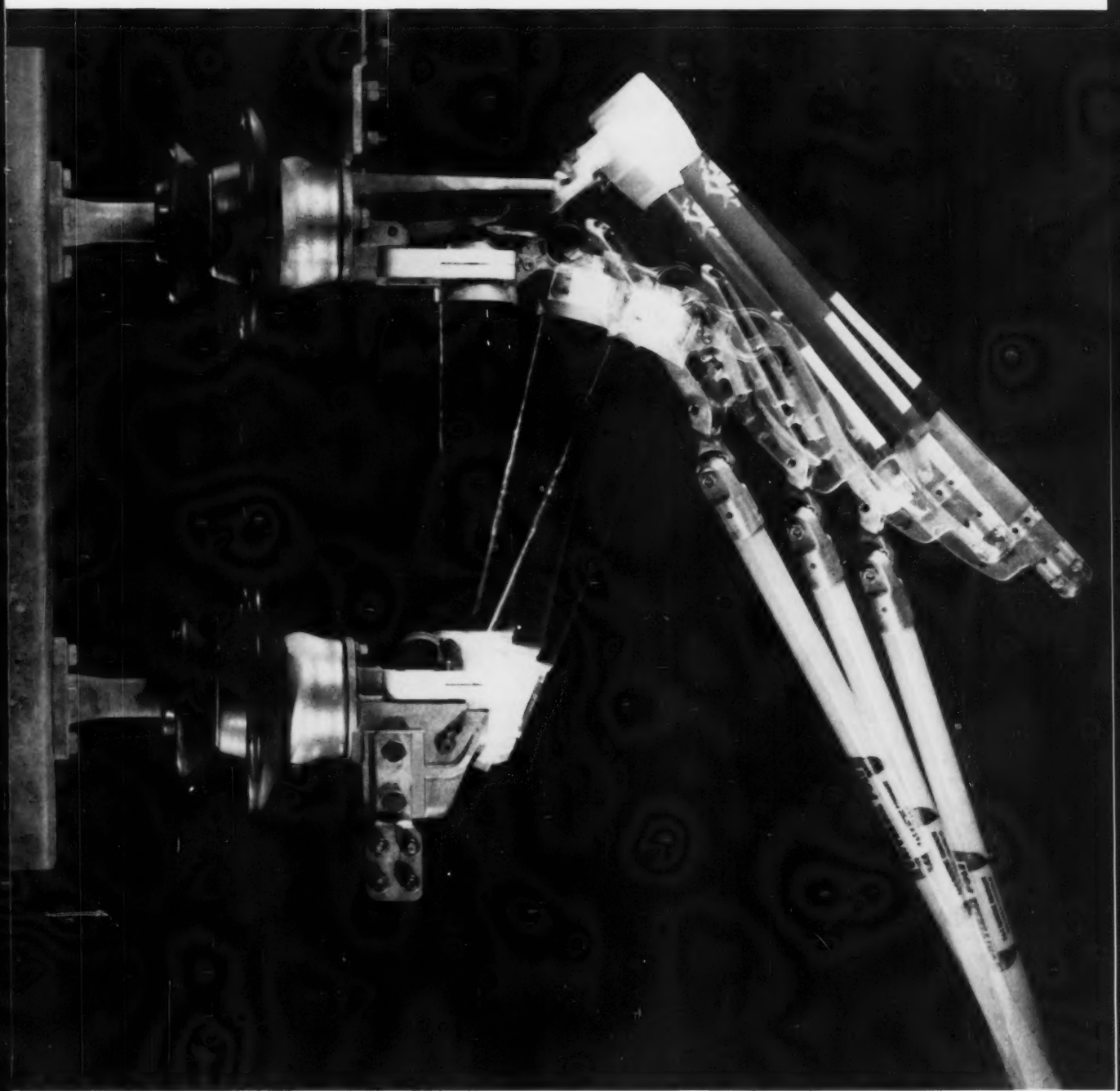
Loadbuster, S&C's portable loadbreak tool, earns its own way by providing truly unlimited load switching when and where it's needed. With its load switching range through 400 amperes at any system voltage through 14.4 kv, Loadbuster works with cutouts, disconnects, power fuses, and pad mounted gear.

Within its voltage range, Loadbuster can interrupt full loads through 400 amperes, all associated magnetizing and line charging currents, and can switch all typical capacitor banks. Thus, this easy-to-carry switching device:

- Replaces link break cutouts
- Provides full load switching for cutouts and power fuses
- Replaces group operated disconnects with stick operated disconnects at sectionalizing points
- Provides full load switching for hookstick disconnects
- Replaces load interrupter switches where group operation is unnecessary
- Brings overhead switching practices to residential underground

Loadbuster's portability, versatility, and long operating life (it's designed for daily field usage) have made it standard equipment on many utility service trucks. Ask your S&C representative for a demonstration of how Loadbuster can cut your operating costs.

S&C ELECTRIC COMPANY
4425 Ravenswood Avenue • Chicago 40, Illinois
Specialists in High Voltage Circuit Interruption since 1911



You simply hook Loadbuster across the upper contact of a disconnect or fuse and open it in the normal way. There is no arc, link breakage, contact burning, or danger to the operator. Just disengage the device and it's ready for instant use again.

*For phone number of closest representative see advertising index in back of book.*

# PEOPLE

**Hi Dillin has two new titles. He was made president of his company in April and became president of PCEA at its 44th annual convention in San Francisco last month. (See convention story, p 70)**

## Dillin Succeeds Sherwin At San Diego G&E

H. G. Dillin was elected president of San Diego Gas & Electric Co. at the April meeting of the utility's board of directors.

Dillin, who has been serving as executive vice president since 1953, succeeds E. D. Sherwin, who retired after 41 years service with the company. Sherwin will continue as a member of the board of directors and of the company's executive committee.

Dillin's association with the company dates back 37 years, when he was first employed as a draftsman.

## Wheelock Retires

Calectric's commercial vice president, D. B. Wheelock, retired March 31 after 41 years with the utility.

Except for a brief period after he first joined Calectric in 1919, Wheelock has served his entire career in the commercial department, rising to the vice-presidential post in 1951. Tribute was paid to him by his associates in a series of functions preceding his retirement.

Following an extended vacation with Mrs. Wheelock, he will return to live in Riverside, Calif.

► **Col. Sterling K. Eisiminger** has been assigned to succeed **Col. Walter L. Winegar** as Portland district engineer for the Army Corps of Engineers, effective in July. Eisiminger is now a student at the Industrial College of the Armed Forces, Washington, D. C. His past assignments include Chief of Engineer Supply, European Command; Chief of Military Supply Requirements, Office of the Chief of Engineers; Assistant Corps Engineer, I Corps, in Korea; military assistant and executive, Assistant Secretary of the Army.

## Frank Falge Retires

Frank Falge retired from General Electric Co. on June 1 and will make his home in Carmel, Calif. With the company for 35 years, he made many friends, first as Pacific Coast manager of the Lamp Department and for the past few years as Western manager for the Live Better Electrically program and the company's residential market development operation. He joined G-E as lighting sales manager at Nela Park in 1926 and during his service there and in the West contributed to knowledge in various phases of lighting. He served in the Navy during the war, retiring with the rank of commander.

John Hippen, advertising and sales promotion manager for G-E's residential market development operation in Louisville, has been transferred to San Francisco to take over as Western region manager.

► **Col. James H. Beddow** has been made Walla Walla District engineer for the Corps of Engineers, effective in June. He succeeds **Col. Paul H. Symbol,** who retired March 31. He has had an active career since he joined the Corps in 1938 and recently has been assigned as deputy chief of staff for administration, U. S. Army Pacific, in Hawaii.

► **Laurence R. Metcalf** has been promoted from assistant chief to chief of the hydraulic design section, design branch, of the Portland Army Engineer District. He succeeds **Marvin Webster,** who retired earlier this year.

► Three new local managers have been appointed by Puget Sound Power & Light Co. **Tom Lynch,** sales consultant at Olympia, will head that office. **Ed Heister,** formerly local manager at Port Orchard, has been made manager at Bremerton to succeed the late **William Bresnahan. Bob Siegfried,** who has been sales consultant in Bremerton, becomes manager at Port Orchard.

**HAPPY BIRTHDAY: While it's a little late we think this scene should be recorded. When Frank Tracy's birthday coincided with a PCEA directors' meeting at Bass Lake, hosts from Pacific Gas and Electric Co. asked the chef to make this cake for their guest from Sierra Pacific**

## New Appointments at Chelan PUD

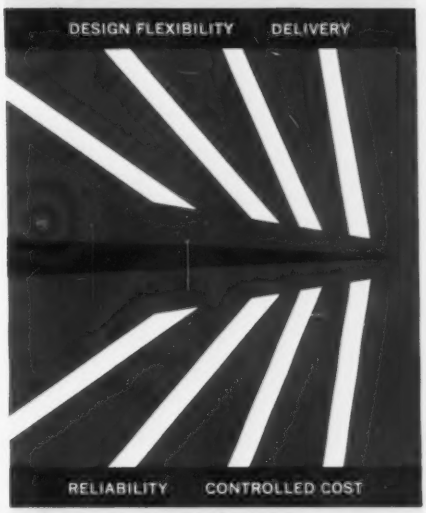
Harley W. Bryant, commercial manager for Chelan County PUD and its predecessor for some 30 years, was named to a newly created position of staff director in charge of community development and information. Another new post, that of clerk of the PUD board, was given to Hale Tabor, research and information officer for the past five years. Tabor will continue to edit the PUD's publications.

Jack Shreve, formerly head of the distribution engineering department, succeeds Bryant as commercial manager. His post will be filled by promotion of Milton S. Pierce, communications engineer. Tom Goodwin, formerly with the Grant County PUD at Ephrata, has been added to the staff to fill Pierce's former position.

► **Owen W. Hurd,** managing director of Washington Public Power Supply System, received the American Public Power Assn.'s highest honor, the Distinguished Service Award, at the recent APPA convention in San Antonio. He is the seventh public power leader in the 21-year history of the association to win the award.

► **Albert C. Salansky,** formerly chief accountant for the Hill County Electric Cooperative at Havre, Mont., has been named office manager for the Clearwater Power Co., REA co-op at Lewiston, Idaho. He succeeds **Albert J. Frei,** who resigned last July after 15 years with the cooperative.

# Westinghouse conquers four barriers to economical superload growth




From 160 million kw today to more than 600 million kw in 1980—this is the challenge to America's electric utilities if they are to meet the needs of a mushrooming population and economy.

By 1980, yearly additions alone will equal approximately all the generating capacity installed throughout the first 40 years of this century. Thus, building more and larger machines with controlled costs becomes one of the industry's biggest problems.

**Through continuing research and development,** Westinghouse is finding answers which can help you plan now to meet future power needs economically.

Westinghouse

# the need . . . bigger, more complex units with high temperatures and pressures

## CERTAIN TRENDS ARE EVIDENT NOW. . .

- Maximum unit sizes—presently 500 mw for single shaft and 1,000 mw for double shaft—are expected to reach 650 mw for the former, and a possible 1250 mw for the latter. Other designs now being studied make even higher ratings feasible.
- In 1980, the number of units built per year will increase more than 15% over the number built in 1960, and large unit design will change from tandem-compound two-, three- and four-flow to cross-compound two-, four- and eight-flow.
- The number of turbine elements required for these complex machines will increase by 50% every 10 years.
- The increasing number and complexity of machines will probably triple the engineering effort needed to build them by 1980.
- Steam conditions—temperatures and pressures—as high as 6000 psi at 1200°F are possible.

These anticipated generating conditions, through which the huge power demands will have to be met, present economic problems which might, at first glance, seem insurmountable.

IN ORDER TO MEET FUTURE POWER NEEDS ECONOMICALLY, MANUFACTURERS OF GENERATING EQUIPMENT WILL HAVE TO . . .

1. Achieve design flexibility, superior engineering and improved manufacturing techniques for a wide range of turbine designs.

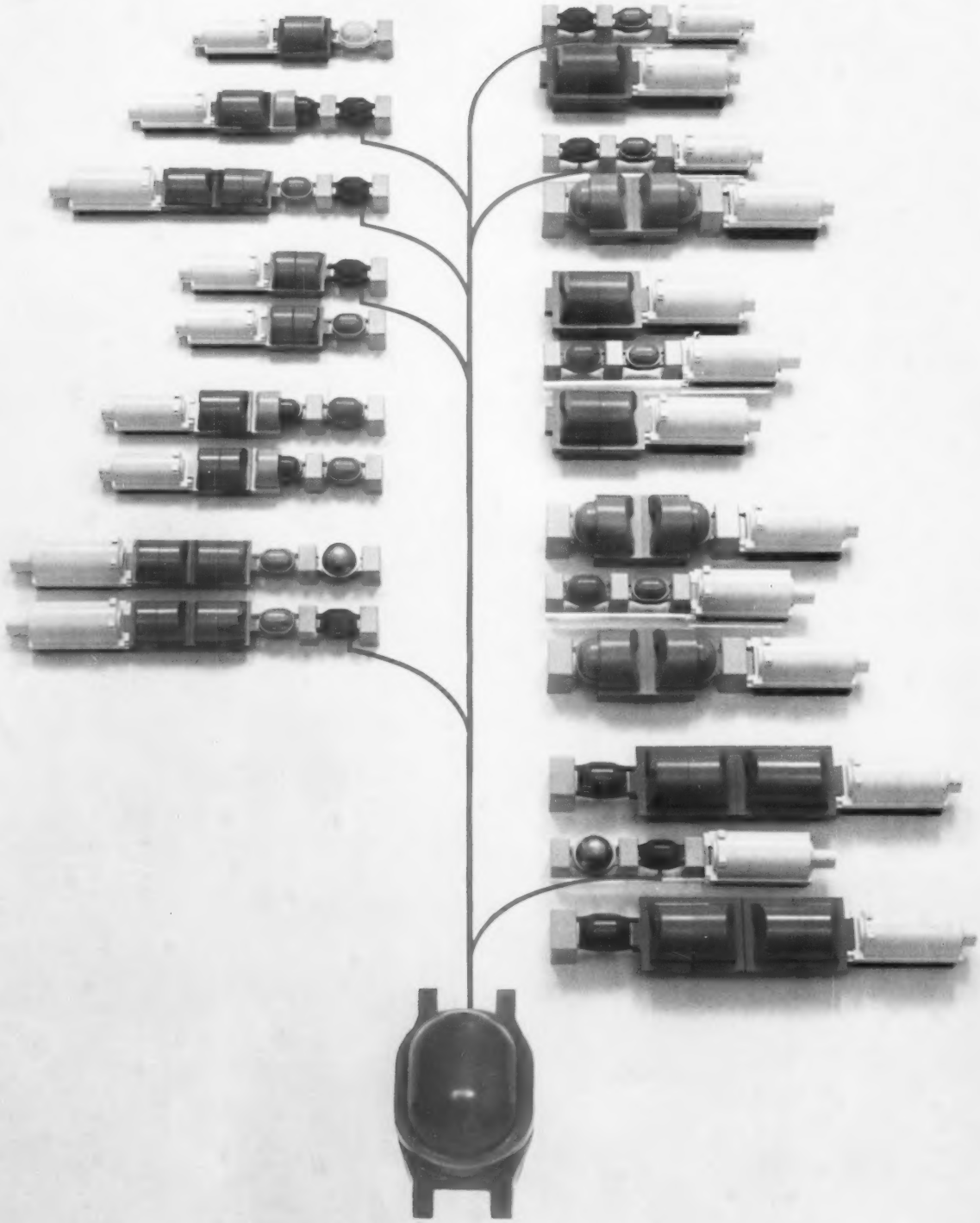
2. Provide shorter schedules for engineering data, for plant studies and for delivery of equipment.

3. Design and build high reliability machines.

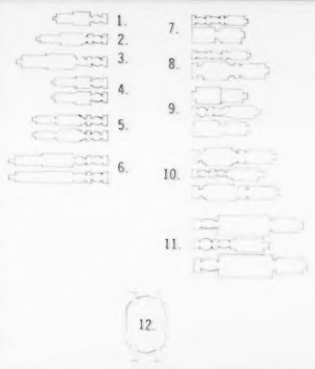
4. Control costs while unit sizes and complexities increase.

Westinghouse, builder of the world's largest tandem-compound turbine-generators, now offers a solution to the economic problems of designing and building this superload growth equipment—the principle of *integrated components*.

Westinghouse



# integrated components save time, man power, money . . . give you design flexibility




**3600 RPM**

1. Tandem-compound two-flow
2. Tandem-compound three-flow
3. Tandem-compound four-flow
4. Cross-compound four-flow
5. Cross-compound six-flow
6. Cross-compound eight-flow

**3600/1800 RPM**

7. Cross-compound two-flow (single case LP)
8. Cross-compound two-flow (two case LP)
9. Triple shaft cross-compound four-flow (single case LP)
10. Triple shaft cross-compound four-flow (two case LP)
11. Triple shaft cross-compound eight-flow
12. High pressure element

Since time is a critical factor in meeting future power needs economically, the possibility of using turbine element similarities (the philosophy of interchangeability) wherever efficiently and economically practical offered a natural solution to Westinghouse designers.

After careful study of the types of machines needed in the future, Westinghouse engineers noted that any type could be built from a combination of basic elements.

Combinations of 3600- and 1800-rpm elements (see opposite page and above) can be arranged to produce single, double and triple shaft units. 3600-rpm elements can be made up in tandem-compound two-, three- and four-flow machines and in cross-compound four-, six- and eight-flow machines. Increased ratings can be produced by adding higher pressure and temperature front ends to a combination of the elements that make up the basic machine arrangements.

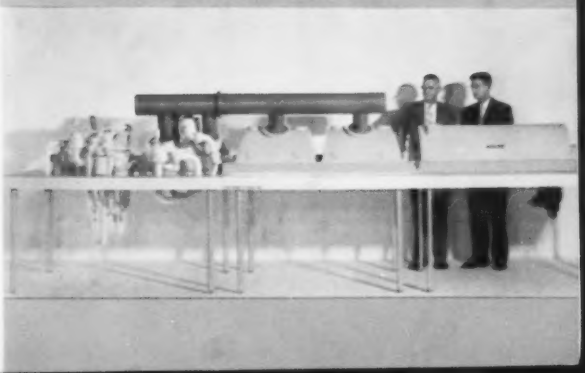
## MANY BENEFITS

By utilizing the interchangeability of these elements, Westinghouse can deliver top efficiency in the shortest time.

- Unnecessary repetition of design and manufacturing engineering is eliminated.
- Machines can be designed and built more quickly.
- Reliability is increased through specialized and concentrated manufacturing experience.
- Costs are controlled—only design modification of elements is necessary.
- Creative man power is freed from solving repetitive problems to develop greater advances and efficiencies.

Coupling these factors with a more uniform heat balance arrangement and basic plant design practice permits the utility to have a well-planned program for adding huge blocks of capacity with a maximum of economy, at highest efficiency.

This typical Westinghouse unit uses advanced design integrated components. With a capacity of 325 mw, this 3600-rpm tandem-compound, four-flow, reheat turbine utilizes an opposed-flow high pressure element, a double-flow intermediate pressure element, and two double-flow low pressure elements. These same elements can be used to build a cross-compound four-flow unit.



Westinghouse

# integrated components lead to greater generator requirements

## YET WESTINGHOUSE IS ABLE TO MATCH GENERATORS TO ANY TURBINE OF THE FUTURE

Current research into metals, new excitation systems, and many other advanced materials and methods, makes it possible *now* for Westinghouse to build generators for any turbine of the future. Two basic breakthroughs—Inner-Cooling and Thermalastic®—have been responsible for today's high capacities, and have opened the door to tremendous future developments.

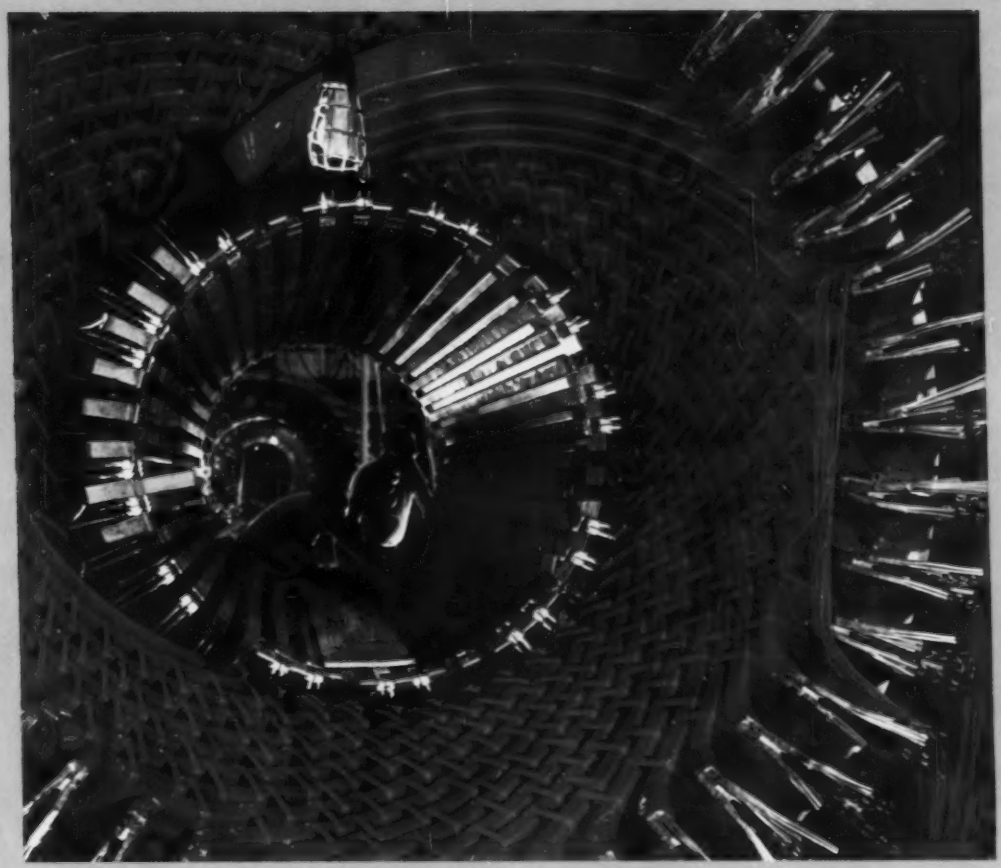
## PRESENT DEVELOPMENTS LEAD TO HIGHER CAPACITIES, LOWER MAINTENANCE

The search for better steels, particularly forgings, is resulting in the development of new alloys and compositions to give maximum strength with suitable ductility. Westinghouse scientists, working with forging suppliers, have developed advancements in forging techniques. Vacuum pouring, for example, excludes hydrogen and other gases and results in improved forging quality.

Other projects include research into impurities, electrical sheet steel with better magnetic properties in all directions, even better Thermalastic Insulation, new ideas in excitation systems and a host of other developments.

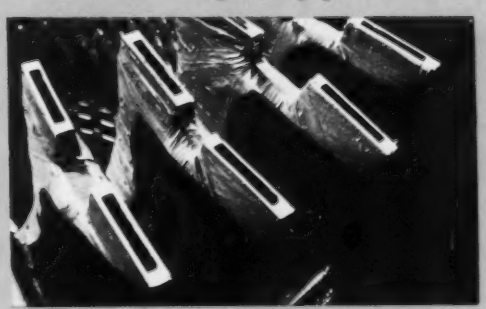
Westinghouse research and development will prove vital in helping you meet *your* future power needs economically.

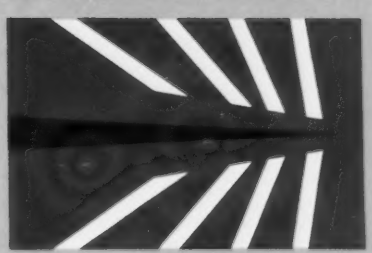
Westinghouse



**Inner-Cooling,** developed by Westinghouse and now a standard feature of all Westinghouse generators 160,000 kva and above, circulates hydrogen through the rotor and stator windings, providing intimate contact with the conductors where heat originates. Inner-Cooling allows ratings of single shaft units to triple over conventionally cooled units and greatly reduces size and weight of equipment.

**Thermalastic Insulation** — the "insulation with a memory"—has a unique molecular structure which permits expansion and contraction of the windings without injurious deformation throughout the life of the machine. Operating voltages cannot get through the fish-scale barrier of mica splittings, which are locked in a memory-type elastic bond.



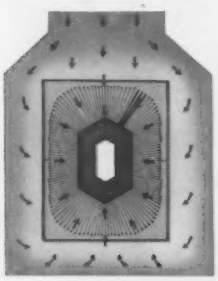


# condenser design flexibility means highest efficiency with any combination of turbine elements

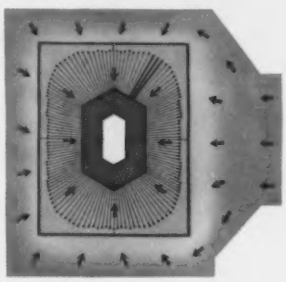
## EXPERIENCE AND COMPLETE LINE OF AUXILIARIES PERMIT BEST DESIGN AT LOWEST COST

The design flexibility of Westinghouse condensers makes it possible even today to fit them to tomorrow's turbine-generator units with maximum efficiency.

Westinghouse condensers are readily adaptable to any turbine exhaust configuration. Exclusive Radial Flow Design permits the exhaust steam to completely envelope the tube bundles at any point of steam inlet.

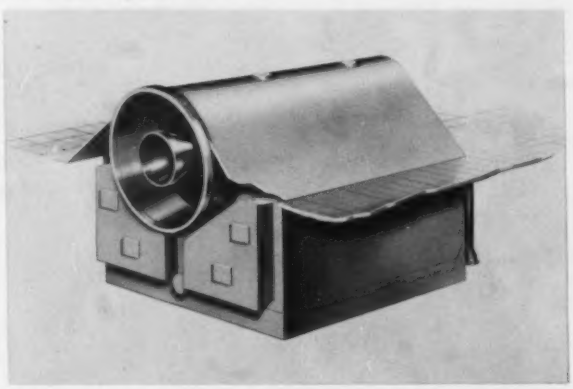


Down Flow



Side Flow

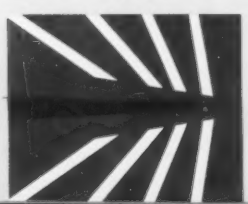
This adaptability, plus a wide range of pumps and auxiliaries, allows for a unified design that gives the highest efficiencies at the lowest cost in a variety of differing installation requirements.



This artist's conception shows an Axial Flow Condenser designed for a large, low-headroom plant. The Radial Flow principle allows for excellent steam distribution for all types of turbine installations.

Research for the future is proceeding in heat transfer apparatus as well as in turbines and generators. For more information, contact your Westinghouse Representative. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

You can be sure . . . if it's **Westinghouse**



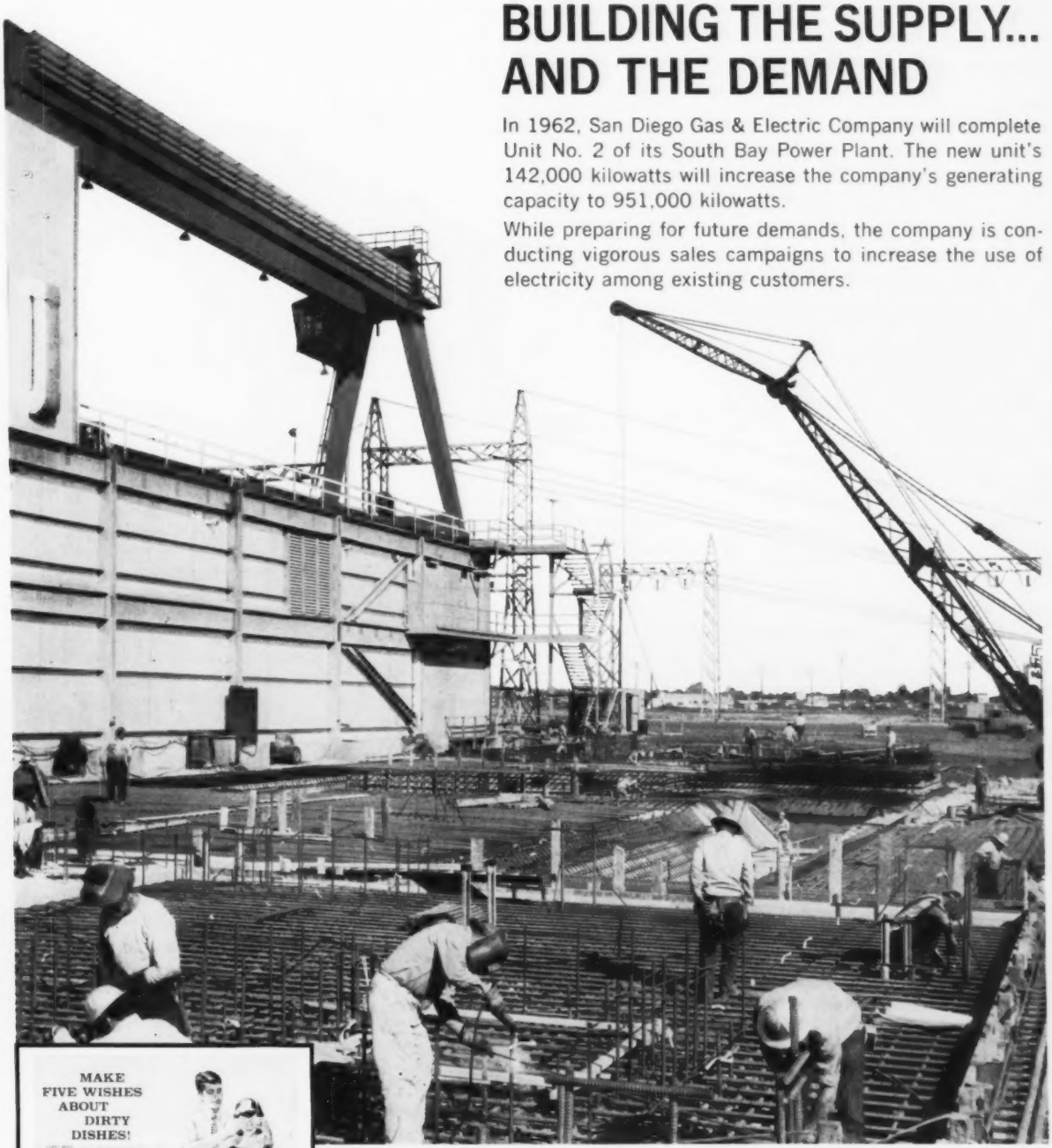
LITHO IN U.S.A. JI-50610-R1

SAN DIEGO GAS & ELECTRIC COMPANY:

# BUILDING THE SUPPLY... AND THE DEMAND

In 1962, San Diego Gas & Electric Company will complete Unit No. 2 of its South Bay Power Plant. The new unit's 142,000 kilowatts will increase the company's generating capacity to 951,000 kilowatts.

While preparing for future demands, the company is conducting vigorous sales campaigns to increase the use of electricity among existing customers.



**A CASE IN POINT:** San Diego Gas & Electric Company is among the first to launch a full-scale program selling load-building automatic dishwashers. The two-month (May-June) campaign includes newspaper advertising, television, radio and dealer promotional material.

This is one of twenty dealer-cooperative load-building promotions planned for 1961.

**SAN DIEGO GAS & ELECTRIC COMPANY**

INVESTOR-OWNED AND LOCALLY MANAGED

ELECTRICAL WEST
VOL. 126 NO. 6 JUNE 1961

JUNTA DEFIES THE U. S.; CLAIMS KOREA RULE

HAVANA ACCUSES U. S.

USS WARN KENNEDY AGAINST 'TOUGH TALK'

U. S. LOSING LATINS TO REDS

*TOO LITTLE, TOO LATE TO STOP REDS IN LAOS*

These are eloquent headlines. They tell us that the time is at hand to re-appraise much of our national conduct. Hopefully we will have the courage to redirect our efforts, even if this involves the ultimate ignominy—admitting that we have been wrong.

These are not questions that reflect on a single political party. They are questions for conscientious Americans to think through and then apply constructive pressure to both parties. For instance:

► After 15 years and $100 billion we should know whether we have succeeded in buying the loyality and respect of the world.

► We should now be able—and willing—to weigh the efforts of the U. N. Is it the sword of freedom or a paper shield? Why doesn't Russia pay part of the bill?

► Is it fair to continue to indenture our children with a $500 billion debt? Will they be less secure because they are paying for our defense?

► And our fetish for universal education—without regard for race, color, creed or economic background. Would everyone be better off if we educated only in accordance with a person's abilities and desire to use the education?

► And sputniks. Would we profit more if we gave the world an international communications system using engines we **have** rather than enter a man in space race where winning requires engines which we do not have?

The following pages offer us the opportunity to assess the role of government in our power business. Our efforts to prepare this material springs from our concern over the present trend for government to dominate education—housing—roads—juvenile delinquency—all phases of our existence. This is socialism, pure and simple. Whatever the "let government do it" proponents' motives, their methods are exactly those that have been set forth by socialists.

Name calling? You bet! If a liberal Democrat or a progressive Republican thinks, acts and works for a socialist program—he is a socialist. New deal, fair deal, new frontier, square deal—balderdash! The motives of the liberals and progressives that made Mr. Castro's socialism possible are unimportant. Their high-minded and humanitarian desires led them to create the climate for totalitarianism—one-man rule. **They shouldn't be judged by what they wanted to do but by what they did do.**

It doesn't take many days' headlines to document the fact that free enterprise—business—at its worst is better than government at its best. People that want government domination of the power business seek to limit freedom of the individual. The issue is not one of names or political parties or people. The issue, kind reader, is freedom.

Where do you stand?

**Concerned by the growing pressure to insinuate government into the power business, the editors have documented the origin and development of collectivist action in the power industry. We think you will be shocked as you read**

# THE TURN TO THE LEFT

The origin of communism and socialism was the Communist Manifesto, the work of Karl Marx and Frederick Engels, first published in 1848.

The communist idea has always been appealing to impoverished peoples. In principle, it is the abolition of private ownership. In practice, it is the sacrifice of personal freedom.

This lure of a better life spawned the Russian revolution. Here the Russian people traded the royal family for Lenin—Stalin and now Khrushchev.

Lenin, communism's patron saint, was fascinated by the potentialities of electric power. He established a commission for the electrification of Russia in 1920. He longed to see Russian industry equal that of western Europe. "Communism," he said, "is the Soviet power plus the electrification of the whole country." In a clash with party thinking he admitted, "Socialism is unthinkable without the technique of large scale capitalism organized in accordance with the last word of the most up-to-date science."

To ape "large scale capitalism," it was agreed to nationalize the major industries. Lenin said: "The enemy within lives by small scale enterprises and to dislodge him there is only one means—the transfer of the economic system of the country including agriculture, to a new technical basis, to the technical basis of contemporary large scale industry. Such a basis is afforded only by electricity." In the wake of the nationalization of industry came compulsory labor laws. Since this time, the Russian people have not been free, nor have they known abundance.

National socialism, the German Nazi party, won over a people and made them Hitler's pawn. Mussolini's fascism was but a shade of socialism. In England, the nationalization of industry failed to improve the British lot and it was rejected. The British people were fortunate not to have lost their franchise. The performance of socialism has been dismal. It listens good, but it doesn't work!

### Socialism in America

In 1920 Eugene Debs ran for president on the socialist ticket. His platform read in part:

**"1. All business vitally essential for the existence and welfare of the people, such as railroads, express service, steamship lines, telegraphs, mines, oil wells, power plants, elevators, packing houses, cold storage plants and all industries operating on a national scale, should be taken over by the nation.**

**"2. All publicly owned industries should be administered jointly by the government and representatives of the workers, not for revenue or profit, but with the sole object of securing just compensation and humane conditions of employment to the workers and efficient and reasonable service to the public.**

**"3. All banks should be acquired by the government and incorporated in a unified public banking system.**

**"4. The business of insurance should be taken over by the government, and should be extended to include insurance against accident, sickness, invalidity, old age and unemployment, without contribution on the part of the worker."**

Debs received only 4% of the vote. The social revolution was caput.

The climate for socialism in America has not been good. A sizable percentage of Americans has been first or second generation immigrants. The Edward Bok's and the A. P. Gianini's knew despotism first hand. They didn't want to rise up against capital. They worshiped the God-given right to work to become capitalists themselves. As a by-product of these efforts, America has become a great nation.

Thoughtful socialists (and the dream has attracted some fine minds) recognized that a new approach was necessary.

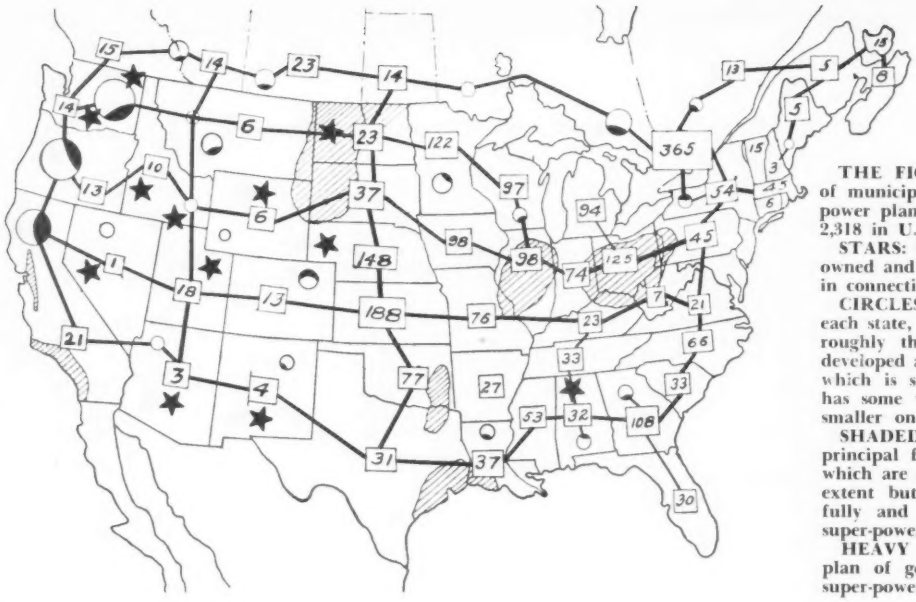
At this time, H. Stephen Raushenbush came forward with a program to socialize the country a bit at a time. The hard-line socialists, still hoping for a revolution, finally lost out to the logic and cunning of Raushenbush's plan. Besides, a revolution for the forceful overthrow of the government was unconstitutional. Encroaching control was perfectly legal. Clever strategy! These Socialists recognized that the average American was prepossessed with his good life. They would use our preoccupation as a screen to take over the government. Writing in the *New Leader* in 1927, Raushenbush summed up the problem thus:

**"The old-time carrying drive of the socialist doctrine was in poverty and prophetic promise. These no longer hold us . . . Between cataclysmic Socialism and encroaching control the latter will be the only one acceptable to this nation for a long while . . . The workers are more apt to go along with the pragmatic test than with the whole-hog policy, more apt to support a power authority than complete nationalization at once of an eight-billion-dollar industry . . . Here the idea is rather to present a reasonable program of encroaching control."**

In a subsequent document entitled "The Socialism of our Times," edited by Norman Thomas, Raushenbush commented in detail on the socialist program for the power industry.

**"We have made three attempts at control. We have set up municipal plants. Their status is changing and we should face that fact. Outside of the large cities they can rarely compete in rates and efficiency with the new plants being established by private companies having the benefit of the connected load of wide interconnections. We have tried regulation by state commissions. It has gotten out of hand. A third attempt to control the water power was in the Federal Water Power Act of 1920. Here we have set down the principle that rates shall not exceed a return on the net cost of the money actually invested, that excess earnings shall be recaptured and that the project may be bought at the end of 50 years by the government at the net cost.**

**"The fourth attempt is that of having government cor-**




## SUPER POWER
## VINTAGE 1923

**THE FIGURES IN BOXES:** Number of municipally owned electric light and power plants in each state and province, 2,318 in U. S. and 401 in Canada.

**STARS:** Hydroelectric power plants owned and operated by U. S. government in connection with Reclamation projects.

**CIRCLES:** Hydroelectric resources in each state, the shaded portion indicating roughly the proportion that has been developed and the unshaded portion that which is still undeveloped. Every state has some water power although in the smaller ones circles have been omitted.

**SHADED PORTIONS:** Location of the principal fuel resources of coal and oil which are already being utilized to some extent but which may be much more fully and economically utilized in the super-power system.

**HEAVY LINES:** Merely suggest the plan of general interconnection of the super-power system.

**porations like the Port Authority of New York operating the power at Muscle Shoals, Boulder Dam and on the St. Lawrence. With these developments furnishing cheap power, these great sections of the country will realize the advantages of public as opposed to private ownership. We cannot hope to take over the whole eight-billion-dollar (electric power) industry successfully, even if it were generally thought advisable to do so at the moment. There would be danger of sabotage. But by putting in a preference that power from these developments shall be furnished to state and municipal plants, we can move toward a system of linked up plants such as the Ontario Hydro-electric Commission.**

**"While the long-time aim of the liberal and radical groups is the abolition of the profit system for private use, our present strategy should be to make and take every opportunity to prove that there is something better than the profit system. Within the next 10 years we are going to have a chance such as we have not had for the last 40."**

Raushenbush's words were prophetic indeed. The material just quoted appeared in 1929. Notice also the role of preference power.

Earlier in the article, Raushenbush had documented the importance of having electric power authorities to convince people that socialistic programs are in the workingman's self-interest. He commented on the value of having students work for the cause, then he went on to say:

**"One good man with his eyes, ears and wits about him, inside the department—whether it be the Interior where the oil scandal started and the Boulder Dam Bill received most active support, or the Treasury, where the taxation scandals breed and the government tax policies originate—can do more to perfect the technique of control over industry than a hundred men outside."**

Raushenbush lived his beliefs. He served as chief of the economics and statistics branch of the Department of the Interior's division of power for many years. In a letter accepting his resignation, J. A. Krug, then Secretary of the Interior, said:

**"You have made a tremendous contribution in carrying forward the program of resource development to which this department is dedicated."**

Another driving source for the socialization of the power industry was Carl D. Thompson. Thompson followed Raushenbush's admonition. He was at one time director of information for the Socialist party, and national campaign manager. In addition to his early work as publisher of the magazine *Public Ownership*, Thompson worked for the Department of the Interior under Secretary Ickes, and later for the Bonneville Power Administration, where he promoted the formation of public power districts—oftentimes writing on the stationery of the Public Ownership League of America. Thompson's work in the Department of the Interior gives an interesting insight into the functioning of creeping socialism.

The depression of the early '30s caused Congress to pass a Public Works Act with provision for giving cities a gift of 30% of the cost of building municipal electric light plants. This was the "make work," the "recession stopper," of 30 years ago. A requirement of the law was that these gifts were dependent upon engineering studies showing that the plants would pay out. This seemingly reasonable requirement took time.

Thompson explains how the matter was handled in his own magazine *Public Ownership*.

**"Following the Public Ownership conference, Secretary Thompson responded to a request of Secretary of the Interior Harold L. Ickes, went over to the department under an appointment as power examiner . . . efforts were made to assist the PWA in speeding up loans and grants of federal funds to municipalities for light and power plants . . ."**

Thompson's most far-reaching plan—the public super power plan—dates back to 1923. At this time Thompson outlined the original fully integrated power grid. (See plan reproduced.)

The Public Ownership League of America called a conference to promote socialization of the power industry. Thompson said in his magazine:

**"The League is launching a movement for nation-wide public hydroelectric and super power for the conservation and utilization of the water powers of the country for the production of electric energy at cost."**

Subsequently, the magazine announced that Senator Norris would introduce the first super power bill. The bill was overambitious—too much socialism in one jump. This was before Raushenbush sold the idea of socialism by degree.

Similar bills were defeated under Senator Norris' guidance in 1926 and '27. In 1928 the official Socialist Party voters guide carried the following statements in regard to their program.

> **"1. Nationalization of our natural resources, beginning with the coal mines and water sites, particularly at Boulder Dam and Muscle Shoals.**
>
> **"2. A publicly owned giant power system under which the federal government shall cooperate with the states and municipalities in the distribution of electrical energy to the people at cost."**

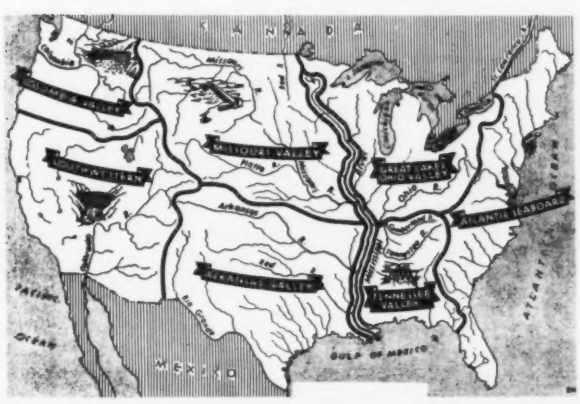
The TVA Act, when passed, carried language so similar to the original super power act presented by Carl Thompson that there can be little question as to the origin and drive behind the TVA legislation. Later, Senator Norris published maps showing power authorities covering the whole nation. The Columbia Valley Authority is still a live issue in the Pacific Northwest.

Creeping socialism was working. Thompson and his colleagues had reason to be proud. Thompson reported a meeting in his magazine with President Roosevelt.

> **"I began by way of introduction to say that I was Secretary of the Public Ownership League of America, etc., but the president interrupted in his jovial manner, saying, 'I know all about it. You are doing a wonderful work. Someday I want to sit down and have a long talk with you.' And then he began to ply us with questions, indicating a better knowledge of the league and its work than I had any reason to expect. Evidently Senator Dill, J. D. Ross and others, who are close friends of the president, must have acquainted him with our work. He continued, 'Tell me," said the president, 'How many municipal light and power plants are we gaining a year?' That, we said, is rather difficult to determine. The power companies take some away from us—we take some away from them. 'Are we making a net gain?' the president put in. Oh yes, certainly. 'Good,' he said in his usual vigorous and emphatic manner."**

The war years created additional situations whereby socialist sympathizers could insinuate government agencies into the power business.

At war's end with the U. S. dupped and discarded by the Soviet leader Stalin, Americans took a new look at the "isms." The aims of international communism were becoming clear. The degree to which communist sympathizers—Alger Hiss, the Rosenbergs, et al—had infiltrated into government became a matter of national alarm. Consequently, it is out of vogue—passe—to be a socialist today. Most important, a marked socialist can no longer serve the cause. Today's proponents of nationalist power are not public proponents of the Socialist Party. They are in the main "liberals." Our purpose now is to set forth the views of today's federal power policy makers and ask our readers to look through form to the substance of these views and determine for themselves. **Are today's public administrators in fact using the ideas of Marx, of Lenin, of Norman Thomas? Are they fighting for the Thompson's super power and using Raushenbush's strategies?**




**Senator Norris maps TVAs for the nation. From the New York Times, June 6, 1937. Valley Authority legislation is still active**

### New Frontier—Or Party Line

The most succinct and representative statement of today's policy springs from the Kennedy-Johnson Natural Resources Advisory Committee. It says in part, "the Department of the Interior, in cooperation with other agencies, must reassert its responsibility to provide long-range planning of generation and transmission facilities to meet future needs, with immediate attention to the economic necessity of interregional federal transmission ties.

"Regional wholesale power supply systems should be made responsible for meeting the expanding wholesale power requirements of all retail electric systems at the lowest possible cost and supplied with as much hydroelectric capacity as is economically feasible for low cost peaking power and reserve capacity.

"Falling water, coal at the mine mouth, atomic energy, or even solar energy could supply the fuel, depending upon conditions in various regions.

"Atomic power, developed and financed by the people, should be made available from federal nuclear power plants as soon as production costs can be materially reduced."

**President Kennedy says,** "The role of the federal government in supplying an important segment of this power is now long established and must continue. We will meet our responsibilities in this field." He has, "directed the Secretary of the Interior to develop plans for the early interconnection of areas served by that department's marketing agencies with adequate common carrier transmission lines; to plan for further national cooperative pooling of electric power, both public and private; and to enlarge such pooling as now exists."

Secretary Udall will give immediate attention to "achieving the maximum practicable amounts of firm power for the ultimate user from federal power systems; enlarging regional cooperative pooling of generating and transmission facilities; and planning for the early interconnection of areas served by the Department of the Interior marketing agencies with adequate common carrier transmission lines."

**Kenneth Holum, assistant secretary for water and power of the Department of the Interior, says:** "You can expect optimum electric power development in all multipurpose projects undertaken by this administration.

"In the Pacific Northwest you should look forward eagerly to the President's program for interconnecting regions served by federal projects with extra high voltage common carrier transmission lines.

"I think the federal government has a real responsibility to make sure that electric energy is always available in adequate supply and at reasonable rates; and I think the federal government's responsibility is a responsibility of providing leadership . . ."

These have been facts; accurate statements we believe in context. The point of this article rests with the reader and his God.

**Thirteen association meetings are summarized in this Electrical West convention report, which shows how the electrical industry is**

# PULLING TOGETHER TO DO A JOB

## . . . in Management

The 1961 conventions have been inordinately well received. Attendance and participation in the working sessions have been high. There's a feeling—unexpressed—that the industry is seeking the true purpose of association; working together to see problems clearly, then taking action. More than ever, the management perspective is rising from our own industry problems to see them as part of national, even international, problems.

Even criticism was cheerfully accepted by a PCEA group. They were looking for solutions, not palaver. Dan Smoot's accusation that the industry was "hiding under the bed" was an outright attack on our industry's unwillingness to risk controversy in order to win a principle. Smoot pointed out the many contradictions that develop when well intentioned people look to government to solve their problems. He indicated that many of those who evince a great concern over the well being of others are not interested in helping their fellow man with their own dollars, they only want to direct the help with tax dollars. He made the point that it was the purpose of our forefathers to limit the scope of the federal government. Many of the prerogatives that have been assumed by the federal government, he indicated, were reserved for state and local governments.

Si Kagan, professor of international business at the University of Oregon, pointed to the desire of the underprivileged peoples of the world for material goods and the population explosion as prime forces that create the background for the struggle between world communism and freedom. He pointed out that those things desired by the underprivileged nations require the accumulation of capital—in order to become a reality. He posed the question: "How do you accumulate capital from a people whose annual per capita income may approximate $100 a year?" Add to this the aggravation of unrestrained population growth and there is certainly the climate for international strife.

"If any of us have any complacency left, we should go out and soak our heads in a bucket," was the comment of K. C. Christensen, who presided over the PCEA convention session addressed by Carl Bahmeier Jr., executive manager of the California Bankers Assn.

Stating at the outset that he came to criticize (and offered his criticisms to his own as well as the electric industry), Bahmeier declared, "we've done a sloppy job"; asked why, if he was wrong, Congress in the past 17 years had not passed a single bill favoring private capital (127 favoring public ownership were passed).

Here are some of the points he made:

Advertising won't solve the problem. It is necessary to get out and fight hand to hand. The theory that we can't do anything because it might hurt us or be rough is for the birds unless we want to go down the drain.

How much do you really believe in private power? In how many of you and your employees does the light shine through?

If you think your work is done at 4:30, remember the other side never loses a chance to tell its story. Political decisions are determined by people who buy draught beer because there are more of them. Getting into politics might even be fun.

The hardest sell is to sell theories. We must have the savvy to translate political action into something that is meaningful to the people.

**TV Commentator Dan Smoot is greeted by C. W. Leihy, Electrical West, program chairman. At right are C. C. Walker, G-E, PCEA convention chairman, and President H. F. Hartzell, Maydwell & Hartzell**

### The Villain in the Recession

The principal villain in the recession just past (one of the mildest in history) was inventory movement, the PCEA convention was told by Robert S. Einzig, vice president, research, Federal Reserve Bank of San Francisco. With all goods and services down 1%, it was in the manufacturing of heavy durable goods that the recession was felt.

"We're going to have a very heavy draft on the recovery because of the high level of unemployment and inventory." Price stabilizing may be

General session speakers, Stanley F. Damkroger, AT&T, New York; Robert S. Einzig, Federal Reserve Bank of San Francisco; and Dwight C. Van Meter, N. W. Ayer & Son, director of ECAP

At the business meeting closing PCEA's 44th annual convention, "Pop" Hartzell presents Vic Hartley, managing director, with a scroll of appreciation for 40 years of service to PCEA

the best way to speed up the growth, according to Einzig, who pointed to the stress and strain that the current technological revolution is putting on all our businesses.

The fact that government is directly concerned with issues of growth brings up the matter of balance of payment, he said, and, although balance is much in the news, government really hasn't done much. The main impact has been in private industry. There's been improvement in this situation but we must do better, he declared.

The Federal Reserve System enters into, influences, but does not control these issues, he pointed out. "We must lean against the wind of recession and at the same time lean against the wind of the outflow of gold. We must all try to stimulate growth and confidence in the dollar."

### Freedom vs Totalitarianism

The role of voluntary association in getting the world's work done was brought out by Bishop James A. Pike of the Episcopal Diocese of California in a PCEA luncheon talk that brought hearty applause. A group, representing the middle band of society, can avoid the anarchy of individual actions or the loss of freedom in government control. "The major issue today is not communism vs democracy. It's freedom vs totalitarianism."

He urges groups to look at things from the biggest point of view, not unaware of self-interest but also aware of the broad perspective.

When government gets into the act, its blueprint is excellent but what it does to the fellow trying to get the job done is a different thing, the Bishop, a former member of the SEC, commented.

Bishop Pike believes in freedom for business and freedom for people (you never know where antifreedom is going to move next) and sees the church as the bastian of freedom. "Let's not label," he asks, "let's take issue by issue and have dialogue."

### We Must Be Tough

"We are citizens of the greatest nation in the world and it is high time we started acting like it." With this blunt statement, Rear Admiral J. P. Monroe, USN, commander of the Pacific Missile Range, Point Mugu, Calif., concluded a PCEA convention talk that urged Americans to stop beating their breasts over U. S. deficiencies and overemphasizing the success of other countries.

No nation can surpass us militarily, economically or morally unless we sit on our hands and let them do it. The two greatest dangers today, as he sees it, are: (1) Americans are losing confidence in themselves and the free enterprise system; and (2) some of them believe the propaganda being directed against us.

We will win the cold war, he said, if we are more dedicated and tougher than our opponents.

In spite of a late start in space, the U. S. has extracted and made available far greater scientific data than the rest of the world and these data are the building blocks that will help us conquer space.

The world is deep in a nuclear age and is going deeper every day and we cannot back out of it. There are far worse things than a nuclear war, he contends; "loss of our freedom is far more serious."

### No Time for Complacency

Looking more closely at our own industry, Paul E. "Tiny" Brookover of the Cheyenne Light, Fuel & Power Co. opened the RMEL meeting by saying that it was no time for complacency. Tiny indicated that if our industry thought they had the world by the tail because full competition was limited they were wrong. He challenged the industry to find ever better ways to serve the public, or the public would take away the right of the industry to serve them.

In another paper of merit, LeRoy Patterson, Public Service Co. of Colorado, described the evolution of the conflict between the all-federal transmission scheme for the Rocky Mountains and the joint scheme recommended by the five private companies in the area.

He concluded by a comparison of the two schemes based on the federal yardsticks.

Joseph F. Little, a Denver attorney, addressed the RMEL group on the subject of "The Crisis in Gold." He traced the historical development of the gold standard in America. He took the group through the changes Roosevelt made to take us off the gold standard and then concluded that our currency faces a grave danger today as pressures build up to remove the 25% reserve limitation. He oncluded that it was in the national interest to agitate so as to get the country back on a firm currency basis and make ourselves competitive in the world economy.

**Among those who kept the wheels rolling at PCEA's convention were G. F. Black, ushers; E. L. Buttner, reception; A. J. Swank, a director; K. C. Christensen, who presided at a general session; C. P. McCarthy, stage manager for the convention**

### Corporate Soul Searching

Marketing starts when a business asks itself some basic questions, said Stanley F. Damkroger, assistant vice president, American T&T, New York, in a PCEA talk, "The Utility's Stake in Dynamic Marketing."

These questions (Bell asked itself all of them) include: What is our business; what kind of growth do we want; what must be done to become a growth business; what is our competition and what must be done to get our full share of the market?

Corporate soul searching started when Bell asked itself if the demand, or horizontal, growth it was enjoying would be challenging enough in the future to keep it a vigorous, vital enterprise, economically healthy. To keep itself constantly stretched and challenged, it decided it must have the vertical growth in new uses of product-service that only marketing can bring about.

## . . . in Personnel and Safety

The task of managing business today requires bringing to the managing of personnel the same scientific habits of thought and foresighted control of change now commonly found only in the management of technology and finance, Frank F. Bradshaw, G-E Management Center, Ossining, N. Y., said at the PCEA Administrative Services conference. This approach will increasingly treat personnel as a fixed asset, personnel development budgets as investment rather than new expense, he pointed out. At the same time that investment in new equipment and automation is planned, funds for retraining and reassigning employees will be provided and viewed similarly as an investment, contributing to the assets of the business.

Speaking on automation in the telephone business, G. M. Dean, vice president and general manager, Bay Area, PT&T, said that it has been good for employees, customers and investors during 40 years of experience. It will undoubtedly continue to change the nature of the work but, as in the past, this will be an evolutionary process. The company will continue to keep in the forefront the impact of such changes on its people and sees splendid job opportunities in the future.

### An Individual Approach

Dr. Walter O. Fischer spoke of "Human Relations; Goals and Horizons" at the RMEL E&O meeting. He talked of human relations as being as old as Pericles and as new as tomorrow. His main theme was built around the philosophy that human relations cannot be compartmentalized as in a personnel department or an engineering department. Rather, it must be an individual approach in love and understanding from the president right on down. He pointed out that love sometimes takes strange shapes and it would take a swift kick in the pants once in awhile to prove to a man that we love him.

Highlight of the NELPA Personnel & Safety Section was a seminar discussion on employee loyalty and what it means to the utility company. The session, chaired by Idaho Power's Bob Sessions, broke the problem down into three parts.

Olin Ririe, Utah Power & Light, discussed loyalty in relation to work and union. He developed the thesis that an individual's loyalty to the union need not conflict with loyalty to his company. He pointed out that loyalty was a commodity that had to be earned continuously by a company's management and that, where company management had the right attitude toward the employee, there would not be serious loyalty problems. He went on to illustrate activities within his company that demonstrated employee loyalty.

Herald Campbell, Pacific Power & Light, discussed the impact of company mergers on the loyalty of employees. He indicated that most of today's companies were the result of mergers in past years. He concluded that, by thoughtful handling, a merger could be consummated without morale problems.

He went on to say, "high employee morale is a by-product of sound organization. It is not a result that can be achieved by and for itself; above all, it is not a result of 'being nice to people' or plying them with favors. Nor is high morale something to be achieved at the expense of good operating results. The same policies, attitudes and practices that are best calculated to produce good operating results over the long run are precisely the policies, attitudes and practices which produce high levels of employee morale."

The final topic, "Loyalty in Relation to Personal or Political Connections," was handled by Vic Casebolt of Washington Water Power. He pointed out that employees with a high degree of public affairs interest were naturally inclined to a conservative view. He concluded, "when employees are treated as individuals and respected for their worth, they grow out of unsound ideas into mature personal convictions. They gain adequacy personally and develop appreciation for their associates. Then they are proud to be a part of their company."

# . . . in Administrative Services

Administrative Services groups are taking seriously their responsibilities for efficient and economic management of plant and manpower. Among the best attended sessions of the joint PCEA-PCGA Administrative Services conference was the one devoted to manpower management. Not drawing the big crowd but bringing forth a good deal of discussion and comment was the session that studied the economics of the utility industry. Whether big or small, however, all sessions made it their business to exchange information helpful to all.

A communications system is really a transportation system, Dr. Alex Bavelas, professor of psychology at Stanford University, told an overflow crowd at manpower management's opening session. It should be designed to get the product where it is wanted without loss, on time and undamaged, he said. He described laboratory experiments conducted in an endeavor to examine the manner and effectiveness of communication processes. No conclusions can be reached, however, about the patterns and their application to any company, he said.

We must keep our costs of operation under control by the constant application of intelligence, understanding and team work, said John C. Arnell, director, industrial relations for Consolidated Edison Co., New York, in a comprehensive discussion of the cost of manpower and its control. We don't have to be "Simon Legrees," but we can continuously seek to devise methods by which our work can be done more efficiently with less waste of time and effort, he pointed out. "Do what you can, with what you have, where you are. . . Be ever vigilant that you are not wasting dollars trying to save pennies. . . Manpower cost control is everybody's responsibility."

Work management results, properly utilized, will prove a powerful managerial tool in scheduling work loads in planning for the future and in justifying present and/or additional manpower and equipment requirements, in the opinion of M. H. Diels, Arizona Public Service Co. They take much of the guesswork out of job classifications and permit employees to see the fruits of their labors and supervisors, to determine high and low work periods. Measurements must be kept current, he emphasized.

Good managers come in all shapes and sizes, according to Louis A. Allen, Louis A. Allen Associates, Palo Alto. They are many kinds of men, all doing a particular kind of work. And to understand what that work is, we must first be clear in our own minds what a manager is and why he exists at all, Allen believes. That is the question that industry by and large has failed to come to grips with. The manager leads by performing identifiable, measurable work, Allen said. This includes leading, planning, organizing and controlling. Men must be selected for their capacity, demonstrated or potential, to master these four key functions and must be trained in the exercise of them. Industry must learn to view the managerial job as a systematic whole. Only then can it hope to produce managers who can be called professionals in any meaningful sense of the word.

### Industry Economics

What an industry must do to avoid occupational and industrial obsolescence was brought out by Raymond A. Ransom, president of R. A. Ransom Co. Inc., Washington, D. C., in a talk that sparked a lively discussion period. Obsolescence in most recent cases has been caused by technological changes, he said, but in some instances governmental actions and in a few cases an intangible that might be called fashion have been responsible for it.

(*Continued on p 74*)

W. T. Quinsler, Arizona PS, section co-chairman, with President H. F. Hartzell

W. E. Johns, PG and E, section co-chairman, right, with Moorhead Wright, G-E, speaker

A post-session discussion at pool side

A phantom product, like energy, is a highly vulnerable product because it is without customer loyalty, he stated. A customer-oriented service, he believes, is one based on the premise that what the customer wants is important. Among the ways to accomplish the objective, he suggested, are (1) market research; (2) product research; (3) development of an equivalent of product loyalty; (4) selling your company to your consumers; (5) development of a forward-looking state of mind within your organization.

The industry must look far ahead if it is going to protect its future, said C. W. Leihy, publisher of ELECTRICAL WEST. New power sources are a challenge and possibly centralized heating and air conditioning for tract developments may be a load growth potential. Administrative services people in particular will have to examine these new developments and possibly work for legislation or regulatory approval for innovations that are on the way, he advised.

We are faced with a task of change in our whole view of ourselves and our tasks, Moorhead Wright, director, Advanced Management Facility, General Electric Co., Crotonville, N. Y., told a luncheon group. Our assignment is to be willing to change in those things that need it and to hold fast to morals and ethics that should not change, he said. We must develop ourselves and those who work for us so that business can prosper and people can grow.

### Purchasing and Stores

The Purchasing & Stores Section of the NELPA convention featured a panel discussion moderated by Portland General Electric's Holly Skillin. Members of the panel included M. S. "Tom" Miksch, Pacific Power & Light; G. K. Lewis, Allis-Chalmers; R. W. Field, G-E Supply; Bill Gallotte, Puget Power.

Some interesting questions and answers:

**Does a supplier have the right to offer alternates?** Gerry Lewis expressed his belief that, were an alternate bid performed as well as the original item and offered extra benefits for the user, within reason this innovation should be evaluated in favor of the firm bringing forth the new idea. He went on to indicate that this competitive advantage is short lived if it places a premium value on the creative side of salesmanship. Bill Gallotte indicated that engineers didn't view alternates as an affront, but that thorough discussion prior to bidding made this an infrequent event.

**Program sponsors: C. R. Salter, Southern California Gas Co., land and rights-of-way; J. R. Kleespies, PG and E, manpower management; Donald Green, San Diego Gas & Electric Co., insurance and claims; E. D. Cuerdon, Arizona Public Service, economics of the utility industry; and R. C. Witter Jr., Southern Counties Gas Co., general accounting**

**If the utility predetermines a favorite bidder, is it fair to ask for additional bids to keep him quiet?** Miksch, "It's not ethical and we don't do it." Gallotte, "The situation doesn't happen except on rush items, in which case they just buy."

**Can purchasing agents do anything to stabilize prices in face of overproduction resulting in price cutting?** Miksch, "No, purchasing agents can't do anything. This is something purchasing agents cannot control. It's a real basic economic problem, but no drive to correct a problem can be made by purchasing agents as a group."

## . . . in Public Relations

How interconnected and pooled public relations power is working to solve utility political and public relations problems was told to the PCEA convention by Dwight C. Van Meter, vice president, N. W. Ayer & Son, New York, and director of ECAP.

This pool would have much greater generating capacity and greater efficiency if the noninterconnected companies would add their reserves, he pointed out. ECAP suffers for want of increased support, either through enlistment of more participants or through increased assessments on present membership (rate has not changed since 1946), he said. It has the additional handicap of rulings that disallow certain costs as business expense for tax purposes.

Using a series of maps and charts, with a clever system of lights to emphasize his points, Van Meter showed the growth of federal power; charges made against the electric industry and how they were bombarded by facts through ECAP and company advertising.

Further federal government in the electric utility business is being promoted with dogged determination and with renewed vigor, he declared. "You might well try again to evaluate public opinion, as it is being influenced to support your possible destruction."

Communication between all of us and our customers is the hardest, most exacting job in the world, J. G. Motheral, vice president, Batten, Barton, Dustine & Osborn, told the PCEA Business Development group.

Except in times of direst crisis, the most dynamic leadership in our country flows from the people themselves and is expressed very often by the organizations they work with, he stated. During the past 50 years, these organizations and particularly those in the electrical industry have become big business, he reminded. The people who have made them great with their patronage want to be shown how they are working to enrich their lives, increase their knowledge and build the power of the free world. "Those of us in these tremendous enterprises had better tell the people straightforwardly and candidly. They had better be convinced our great and growing companies are their friends indeed."

**Panel gets ready to discuss Selling All Electric in 1961. From left, Jack Kiedaisch, Arizona PS; T. M. McDaniel Jr., Southern California Edison; George Tenney, moderator; O. R. Doerr, PG and E; R. J. Phillips, San Diego G&E; Chairman Frank Falge, G-E, standing**

# . . . in Market Development

A renewed determination to sell all-electric all the way and to learn how to do a better job through association made itself felt in the PCEA's Business Development conference in San Francisco. The importance of pulling together was underscored by more than one speaker on more than one subject.

Associations have the key to solving problems that must be solved if we are to effectively tell Mr. and Mrs. Consumer that the electric way is the only way, Darcie H. White, Utah Power & Light Co., said at the opening session. Although the present high status of the industry is the result of a tremendous cooperative selling effort, we still have a way to go before we are pulling together in all circumstances, he indicated. As proof he cited instances of sales killed by thoughtless or uninformed comments from an industry associate or ally.

Organizations can correct this situation by fostering understanding and giving information. They can also work together to correct abuses and solve competitive problems and to build the industry's image.

Now is the time to cooperate on political matters, he declared. He proposed that some means be established to communicate the industry's problems to its friends, suggesting that NELPA and PCEA establish a clearing house where those needing assistance could call on members of both groups. "Alone each of us can do so little on a national issue; together we can be very effective."

"We must invent ourselves into continued prosperity and into an improved business climate," declared Howard Willoughby, executive vice president, *Sunset Magazine*. The innovational push experienced since the war has been based on a flood of things, mostly owing their origin to major scientific progress in several fields, he said, and it is here and with $10 billion being spent annually by industry in research that our most important key to continued prosperity and a favorable business climate lies. The West has assets that make it a market of unusual opportunity, provided a climate conducive to business enterprising can be maintained, he pointed out.

Although about everybody is talking about the economic climate, too few are doing anything about it in the opinion of John G. Neukom, director of McKinsey & Co., whose luncheon talk was titled "Make Your Own Weather." There is a great deal that can be done about it, he believes, and the real opportunity rests with those who have the responsibility for making decisions in free enterprise. It behooves them to do their best to influence the climate favorably; to look out the window occasionally and see what is going on; to make adjustments from time to time, to manage finances competently.

### Promotions

How mass promotion pays off was told by John S. C. Ross, manager of residential sales for PG and E, at a joint luncheon meeting for PCEA business development people and the San Francisco Electric Club. In detailing the highly successful program, which won the EEI residential sales promotion award in 1960, Ross emphasized that he was telling the story of what the whole

**At PCEA's Business Development conference, Frank Falge, G-E, section chairman; Darcie White, Utah Power & Light Co.; and W. L. Greer, Pacific Gas and Electric Co., conference chairman**

J. H. Mead, Southern California Edison; W. A. Cyr, Electrical West; P. F. O'Neill, General Electric; Arthur Goldman, House & Home; George Harter NECA; John S. C. Ross, Pacific Gas and Electric Co., all speakers at the PCEA's Business Development sessions

electrical industry did in northern and central California. "We enjoy a high degree of industry cooperation in this area," he said. "We look to the PCEA to provide the invaluable service of a means of exchanging ideas between areas. We look to the Northern California Electrical Bureau to put selling ideas to work in *our* area."

At the close of the luncheon, Jack Ross was presented with a scroll from the Northern California Electrical Bureau, commemorating more than 38 years of outstanding service.

The Live Better Electrically program is contributing $2,500,000 to sell more residential kwh by advertising specific competitive equipment in terms of the all-electric living concept. This program was ably presented in dialogue and slides at the PCEA Business Development conference by J. H. Mead, vice president of Southern California Edison Co., and at its convention by Albert V. Lowe, manager of the program for Edison Electric Institute.

### Electrical Industry Fund

How the electrical industry's promotional campaigns and aims can now receive substantial support from the electrical contractors and the electrical unions through a Joint Industry Fund was recounted in detail by George Harter, manager of the Santa Clara-San Benito Chapter of National Electrical Contractors Assn. at the PCEA Business Development session.

After describing the history of such funds and their approval as a rider to electrical wage rates by the union top officialdom, Harter described the purposes for which they are being used and the $114,000 budget set up in his own area for these purposes. Last year's income from the fund was $99,000, he reported.

"For 50 years the industry has grown without any cohesive or collective help by the electrical contractors," said Harter, "and now the contractors want to assume their share of developing this growth."

### Electric Heating and Cooling

With about 150 manufacturers making or assembling heating devices, the industry must get out and sell the features and advantages of electric systems, Paul F. O'Neill, General Electric Co., Louisville, pointed out. The tendency now is for each salesman to dwell on the faults of the other makes. If they continue to tear each other apart, they will be the best salesmen the gas industry has, he declared.

Arthur Goldman, market research director, *House & Home*, also referred to electric heating in his talk on housing trends. He advised utilities to do their own policing against cheap and shoddy equipment that gives the public the wrong impression. Go to the new market first, then capture modernization; go after the quality builder, who also influences what goes into old homes, do your damnedest to get model homes, he urged. Take into consideration realtors, architects, lending agencies, he suggested.

Both O'Neill and Goldman referred to the new apartment house market, where young people would learn about electric comfort conditioning and want it when they build their own homes.

The heating and air conditioning committee, under the chairmanship of Hyram Andrade, General Electric Co., was one of the best attended and most vital meetings at the convention. The group came to grips with two of the major problems confronting the increased use of electric heating and cooling devices. H. M. Blumenshine of the Holly-General Co. discussed a proposed consumers' guide to electric heating and cooling. The guide, which is currently in the rough stage, is an attempt to give the potential owner an honest view of what currently available equipment can and cannot do.

An even more critical problem concerns the inability of owners of this equipment to receive on-the-spot maintenance and repair whenever the equipment gets in trouble. The service problem was so bad, reported one of the manufacturers, that seven out of 10 equipments returned to the factory as faulty were found to be in perfect working condition. It was suggested, and generally agreed, that a series of training programs, probably lasting 15 weeks, would have to be conducted in all areas before the servicing bottlenecks were overcome.

### Projecting "What's New"

With a fast "spaceman's rocket-eye view" around the electrical world to spy out some of the more significant "news," William A. Cyr, consulting editor, ELECTRICAL WEST, swept the immediate horizon and beyond to alert the audience (in which "almost a new generation has been run in on me") to what is new. From appliance distribution blast-off from the electrical outlets to discounters and now signs of sneaking back a bit, on through fuel cell potentialities, wiring trends, new kinds of lighting, epoxies, building trends, foreign competition, cybernetics and a "New Capitalism" with which to do it all, Cyr took his amused listeners on a wide, wild and wonderful journey into Tomorrowland.

Its edges smoothed by humor, the talk contained many goads to the

electrical industry to awaken it to trends that might prove its undoing. Nevertheless he did indicate how by use of electricity's superior ability to control its own application many long-needed improvements are being made in appliance automation, light control, wiring methods, ballast and motor protection, and business machine automation.

As a closing challenge to the younger and newer people in the industry, he suggested that they find the means to meet the demands of the technological age, not with the unworkable political "full employment" doctrine of "contrived toil" but with a new capitalism described by Adler and Kelson, in which a majority may derive at least half their income from investing their capital in the technology to further release mankind from subsistence toil.

**At the Home Economics meeting, Willie Mae Rogers, Good Housekeeping Institute; Marguerite Fenner, PG and E; Helen R. Taaffe, Westinghouse; Mary K. Means, San Diego G&E**

### Home Economics

Utility home service must change to meet today's needs, Willie Mae Rogers, director of the Good Housekeeping Institute, told the home economics committee. The life of the American woman has been revolutionized and your work should be revolutionized too because, with all her broadened horizons, she needs your help more than ever, she said.

If she were in utility home service today (she formerly was with Union Electric) she would fight for management approval of home calls, which she believes are the bedrock of a sound home service program. Management would say it couldn't afford it but she would still fight and try to reduce the cost of this service, the "only thing that keeps you close to women."

Home service people also need to know about their place in the overall business of their companies. The home service woman is in business to sell—to sell her job services to the public and to management.

The future is just as important as the people in home service today make it. We bring it on ourselves if management says "here is something we can do without."

### Sell All-Electric in 1961

Subjected to a barrage of rather searching questions, the top sales executives of four major utility companies responded with amazing frankness, withal some fast footwork, in a panel to conclude the conference. George C. Tenney, retired McGraw-Hill vice president, hurried over from his University of California classes to be its moderator and put the questions.

Each was asked to give a quick review of what his company was doing to sell all-electric in 1961. On the panel were O. R. Doerr, vice president, PG and E; T. M. McDaniel Jr., vice president, Southern California Edison (who characterized himself as the only uninhibited straight electric member of the panel); R. J. Phillips, vice president, San Diego Gas & Electric; and Jack A. Kiedaisch, Metropolitan sales manager, substituting for Don

*(Continued on p 97)*

**Otis Monroe, at mike, moderated the commercial cooking panel. The panel: Ken Wells, Wells Commercial Sales; Pat Baldock, Raytheon: Nathan Shafer, Sierra Pacific Power; George Klopp, Hot-point; Sam Bush, Southern Nevada Power; G. F. Burgess, Calectric**

MEMO FOR BOBBY K.

Char-ac-a-tures
HELPA
OLIN RIRIE
AL KRIEG
JEAN FAULKNER
PLEASE FILE THIS WHERE WE CAN FIND IT!
BOB LEMMON
JOE (2-PAIR) WILLIAMS
---AND I'LL RAISE YOU TWO CIRCUIT BREAKERS
MRS. JOE WILLIAMS—
"The Hostess with the Mostest"
THIS IS WHAT WE DIDN'T TELL THEM ABOUT EMPLOYEE MORALE
WALLY GORDON
BOB SESSIONS

**One of the highlights of the PCEA general convention in San Francisco was this panel who discussed the Future of Atomic Power**

# . . . in Engineering and Operating

As sometimes happens, the real theme of the Western Engineering & Operating conferences came in the bull sessions. This theme was expressed over and over as the need for engineering personnel to make honest decisions based on the best knowledge available, but not limited to the equipment presently available or tried and true methods.

Igor Karassik, manager of planning of Worthington Corp., spoke at the PCEA and RMEL meetings and brought to mind a statement he made some time ago on this same subject. To wit, "We engineers are faced with constant decisions, required to justify our every action, destined to make numberless errors and beset with difficulties at every turn. How easy, then, to surrender our right to make these decisions to a tabulation of symbols inscribed in black ink on an innocent piece of white paper. To make the mute testimony of numbers responsible for all our conclusions. To blame the errors on some mysterious inconsistency between these numbers and the actual facts. And to shrug off the difficulties on to whatever or whoever lacks the protection of other numbers, other equations and other dry statistics."

Engineers at these meetings seemed to have a new determination to accept these challenges and to make their future decisions based on their own convictions.

**At the RMEL E&O meeting, if you came early, you had a chance to win a prize**

### Transmission Line Design

The PCEA E&O meeting brought out several papers on transmission including "Highlights of Extra High Voltage" by Donald H. Sandell of Alcoa. Sandell pointed out that it appeared extra high voltage transmission lines will be used in the future to become (1) backbones of transmission grids; (2) long distance supply lines from hydro installations; (3) bulk carriers of thermal generation; and (4) high capacity buses between large power plants.

H. D. Fischer Jr. and D. A. Hodges of Southern California Edison Co. pointed out the need to increase current carrying capacity of transmission lines in those areas where rights-of-way are becoming difficult to acquire, meaning that more power need be transmitted over existing lines.

They stated that one way out of this dilemma was the use of bundled conductors. In connection with Edison's 1962 installation of two 300-mw generating units at its Alamitos steam station, the company approached this problem of right-of-way and transmission economies by planning the construction of two 5.6-mile 220-kv circuits each equipped with two 1,033 mcm ACSR conductors per phase.

### Aluminum Towers

The design, construction and maintenance of aluminum transmission structures were discussed by J. E. Williams of Alcoa. He talked about the basic differences between mechanical properties of steel and aluminum alloys and their effect on tower design specifications. The design and use of special extrusions in tower designs were also discussed.

In a paper, "Transformer Developments Affecting Insulation Coordination at Transmission and

**In any event, you got first shot at the easy chairs as Jack Fuller of G-E did**

EHV Levels," S. Bennon of Westinghouse said that advances in the lightning arrester art have permitted the use of transformers with reduced insulation levels. These advances have simultaneously increased arrester reliability and reduced spark-over and current discharge voltages.

### Distribution

PCEA looked at underground distribution from three viewpoints, from that of the electric utility, the telephone company, and the real estate developer.

Carter Blankenburg of Southern California Edison said, "Credit for acceptance of underground, at extra cost, goes to those developers who have realized the advantages that underground offers and to the buying public who has found underground tracts to be worth the extra cost. We see no evidence of these extra costs being a sales barrier. We do not find that developers try underground and then abandon the idea. All evidence leads us to believe that it is acceptable to the developer and to the home buyer at what it costs today."

"We feel that power and telephone poles are one of the most unsightly parts of our communities today," said Robert Bine, administrative engineer of the Irvine Co. (real estate developers). This company felt so favorable toward the underground utility concept that all of its lands developed in the Newport area used underground systems, and the concept has been established as part of the planning criteria for the new city around the university to be built north of Corona del Mar.

Bine also stated his belief that the power company should do something about the high voltage transmission lines serving a residential area. He stated, "If the residential areas are going to spend hundreds of thousands of dollars on underground, these main pole lines should either be underground or on structures that have an aesthetic appearance, also substations should be laid out, designed and landscaped to make them an attractive asset to a community rather than a blight."

For the telephone company, J. T. O'Connell of AT&T stated that in general they felt most of the major problems associated with providing equipment, materials and methods for direct buried telephone plants have been solved and that the remaining problems are being vigorously pursued, and the search for improved methods, tools and materials continued.

For the utilities, Carter Blankenburg countered with the statement, "Direct buried power cable systems do not offer over-all economy in residential areas at present. Experiences of some years ago confirm this. Allowance for growth is difficult and costly with direct buried systems. Future retrenching costs and related public relations problems are against the direct buried concept. Additional cost reductions via plastic duct and simplified trenching will make the duct-lay concept even more advantageous."

Henry J. Barta of S&C Electric discussed some solutions to the operating and safety problems met in the trend from overhead to underground residential, commercial and industrial distribution systems. His solution was based on the use of the pad-mounted concept with presently available equipment so that the servicing personnel maintained familiar overhead, in-air practices.

In the Northwest, Allan T. Johnson says, "A few of the factors that led Portland General Electric into a residential underground distribution program are: to satisfy requests of our customers; to place ourselves in a better position to compete with other sources of energy; to reduce the ratio of maintenance costs to capital costs present in our overhead construction; and, as a corporate citizen of the community, to cooperate with the community in producing less obtrusive utility installations." Johnson discussed some of the design criteria within his company for residential underground and then turned the discussion over to Don Selden, who told how they install and operate the underground system. Selden pointed out that one of their basic problems was that of coordination. He said, "Moving in prematurely at a developer's eagerness or holding off until the builders are clamoring for service can present a multitude of extra problems."

R. C. Graham, chief engineer, Rome Cable Division of Alcoa, told the PCEA meeting that the designs for control cables run into hundreds of types due to different ideas for conductor strandings, sizes, insulations, groupings, colors, coverings, etc., resulting in commercial and technical problems as well as production difficulties. The major reasons for this situation appeared to be due to historial preference or specific cases of trouble.

Some thoughts on surge protection of substations were presented to the NELPA group by E. W. Du Bois of Westinghouse. He said that any analysis of this problem was a classic example of the risk-economy problem since it was a search for the most acceptable compromise between safety of operation and economy of application. Further, that knowledge of three factors is necessary if optimum balance of risk and economy is to be achieved. These are: (1) characteristics of the surge voltage which appeared in a power system with respect to magnitudes and wave shapes; (2) frequency of currents of surge voltage; (3) characteristics of the insulation system to be protected and of the protective devices.

At PCEA, George W. Cooper, Line Material Industries, told the group of the acceptance of automatic oil circuit reclosers for distribution substation application in the past few years.

L. S. Horton, California Oregon Power, told NELPA that a question often arises during system planning concerning providing duplicate service to distribution substations. In an effort to answer this question, he sent a questionnaire to several Northwest and one Eastern utility. A summary of the replies did not indicate a definite pattern, but rather that each company has its own individual policy, determined by necessity, precedence, economics, outages, size of station, importance and several other features.

### Transformer Design

From the Westinghouse side of the picture at PCEA, A. M. Lockie stated, "The optimum design (in distribution transformers) is one in which the fundamental limits to loading—thermal, voltage and economic—are well balanced, at values that permit heavier loading than is common today. It seems probable that transformers in which a 65 C rated load rise is combined with a reduced loss ratio and the use of appropriate materials, will come close to this on most systems."

At RMEL, Willis M. Winslow and Robert K. McCaig, Public Service Co. of Colorado, discussed the problem of providing a spot network from radial feeders.

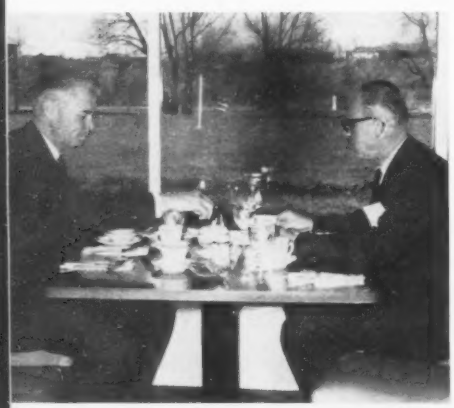
They had a real problem at Stapleton Field, where United Airines required continuity of service from two radial feeders with a switchover time of under nine cycles. Since the nine cycles could not be guaranteed, it was decided to serve this customer by means of a secondary spot network using the two 4-kv radial feeders already serving the area as primary feeders.

At the same meeting, R. E. Reinbold, Arizona Public Service, stated, "The economic advantages of using capacitors for power factor correction is well established but it is not always realized that with very little additional cost these same switched capacitors can often take over the job of voltage regulation."

### Atomic Power

The final day of the PCEA annual convention brought a turn to the more technical side with a session on nuclear power.

The opening speaker was Dr. A. J. Vander Weyden of the Division of Reactor Development, U. S. Atomic Energy Commission, Washington, D. C. Following his talk a symposium on the "Future of Atomic Power" was presented, featuring Norman R. Sutherland, president of Pacific Gas and Electric, as moderator; W. Kenneth Davis, vice president, Nuclear Division, Bechtel Corp.; C. C. Whelchel, chief mechanical engineer of Pacific Gas and Electric Co.; Lewis Lengnik, vice president and chief engineer of Hawaiian Electric Co.; and Harold Quinton, chairman of the board, Southern California Edison Co.



Dr. Vander Weyden said that several years ago the Atomic Energy Commission established the objective of competitive nuclear power in high fuel cost areas within 10 years. He defined high fuel cost areas as those where the cost exceeded 35¢ per million Btu.

Dr. Vander Weyden said that this objective had been accepted by most segments of the nation and that the technology had proved sufficient. However, the nuclear plants have not been built to prove the economical feasibility of the technical advances.

He cited as his answer to this lack of progress, "not inadequacy of technology, but inadequacy of government-utility industry procedures for cooperative construction of commercial plants."

He went on to say, "The present commission authority allows the commission to participate in the construction of commercial scale demonstration plants in three ways: (a) we can construct and operate the plants at our own sites and use the power for our own purposes — or dump the steam. (b) We can construct the reactor portion of the plants to feed steam into turbines owned by publicly owned utilities. The utilities operate the reactor for our account. (c) We can give research and use charge waiver assistance to investor-owned utilities who build and operate such plants.

"The commission policy is to follow the procedure in (c) above."

After discussing various means by which the government could help utilities build power plants, Dr. Vander Weyden said, "I feel personally that incentives alone will not do the trick—that, to assure that necessary plants will be constructed and operated, we may have to embark upon a program under which the initial burden and the risk are both removed from the utilities."

As a final solution he suggested that possibly a desirable approach might involve a scheme of construction by the government on private utility grids, operation by the utilities for the government for a few years, purchase by the utility of the power during the period of government ownership, and finally purchase of plants for continued operation by the utility when the reliability and economics had been proved.

W. Kenneth Davis opened the symposium on the "Future of Atomic Power" with a statistical review of the energy requirements in the State of California, followed by information indicating that nuclear power will become competitive in this decade. He concluded that we need more information on the ownership and cost of fuel as long as it remains in government hands.

C. C. Whelchel reviewed the Pacific Gas and Electric Co.'s entry into the nuclear power field some 10 years ago and brought the convention up to date on their future developments through the Humboldt Bay plant, which is now under construction. He indicated that, with the rising price of conventional steam fuel, this decade may well see the last of conventional steam units added to its system.

Lewis Lengnick of Hawaiian Electric gave a careful review of his company's need for other energy sources. Citing their complete dependence on ocean-transported oil, he stated that their next two units will be conventional steam plants with a study late in the '60s to determine if the next plant should be nuclear fueled.

Harold Quinton spoke of the uncertain costs of nuclear fuels and then turned his attention to siting. He said, "As to siting, naturally the public has become concerned because of the background of the de-

**You had to get up early if you wanted to catch all the conversation at the RMEL's E&O meeting at Boulder, Colo. The group chairmen, like Dave Johnston, kept the sessions going at a fast clip throughout the day. In the evening the ladies joined the group and the talking continued on into the night. . . . A real field day for intercompany communications**

velopment in nuclear energy and of the fear that a nuclear plant may one day act like an atomic bomb. None of us here believes that such a condition could obtain, but siting necessarily requires thorough consideration of every potential hazard, and the very nature of these hazards tends to subjectively complicate plant location. What is the utilization future of the area adjacent to a nuclear plant? Unfortunately, experience is required before siting hazards can be well evaluated, but the first plants which will produce the experience can only be built without it."

He indicated that the question still remained, "How do we handle the interim?"

After the presentation of prepared papers, the panel was opened to questioning.

Sutherland and Quinton were asked their opinions as to Dr. Vander Weyden's proposal with respect to government-investor utility cooperation.

Sutherland indicated that it was the policy of the Pacific Gas and Electric to "go it alone" at the present time. He further indicated that this policy had been maintained even to the point of refusing the government's offer of waiver of rental charges on fuel for proposed plants.

Quinton indicated a similar belief, however he went on to say that if it was the government's desire to have a "speed-up" in the atomic-energy-for-electric-power program in order to build national prestige with leadership in this field, he felt the additional cost due to the "speed-up" should be borne by the people as a whole much the same as for nuclear submarines, and other projects in the national interest.

### Generation

Perhaps the most exciting idea in thermal generation was the economic possibilities inherent in the application of gas turbines, either in peaking situations or in combined cycles. General Electric Co.'s Clem Sutton Jr. maintained that studies completed within the past year showed the combined cycle as being able to offer today heat-rate improvements which might not come through the economics of size and increasing pressure and temperature for another 10 years.

Westinghouse Electric's J. O. Stephens also discussed the gas turbine. He discussed a modular arrangement that would make it possible to extend the kilowatt range as high as 150,000 kw.

Speaking also on combined cycles, T. M. Hotchkiss, Southern California Edison, pointed to the concurrent need for improved reliability as well as improved efficiency. Without being negative, Hotchkiss indicated the kind of careful consideration that would have to be given to any aspect of the combined cycle that might limit reliability.

### Station Auxiliaries

Two papers on power station auxiliaries came to the fore. Lawrence R. Roche, control engineer for the Elliott Co., discussed the development of a new harmonic excitation system for turbine-generators. The new system draws on the triplen harmonics and the flex wave. The power is gained without additional excitation of the main generator field. A 25,600-kva turbogenerator, using the new system, has been developed and tested with very encouraging results.

Worthington Corp.'s venerable Igor Karassik presented a worthwhile paper on boiler feed pump trends. At one point, expressing his belief that the boiler feed pump would keep pace with other station components, Karassik said, "it is my firm conviction that super speed boiler feed pumps, running at 18,000-25,000 rpm will soon appear — at least in a few experimental installations." He concluded by stating a belief that the boiler feed pump of the future would be built, tested and welded permanently into the feed water circuit without ever requiring dismantling for inspection or overhaul.

Looking at the peaking problem of the steam generator manufacturer's viewpoint, C. F. Hawley, Riley Stoker Corp., suggested that plants be designed to offer extended capability above and beyond their basic highly efficient operating ratings. He indicated that increased capabilities up to 40% or 50% were possible and that where this was done the cost per peak kilowatt for the steam generator was in the range of 25% of the cost of the steam generating equipment for the basic.

### Computers and Automation

The PCEA seminar on the use of computers in automation brought together an impressive array of know-how on the subject. Jeff Hunnicutt, Thompson-Ramo-Wooldridge Corp., discussed the amount of automation from the plant which has logging, scanning and alarming to the completely automatic plant in terms of the economic benefit to the user. R. G. Livingston, G-E, discussed some of the areas of computer application about which little was known prior to the actual task of building a computer operated station. He made the group aware of the vast number of stations operating conditions and variables, which might be interrelated to make the automated plant work.

**J. O. Stephens, Westinghouse Electric Corp.; T. M. Hotchkiss, Southern California Edison Co.; and C. E. Sutton, General Electric Co., discussed the combined steam and gas turbine cycles at the PCEA Engineering and Operating conference in Los Angeles**

**Many groups with knotted brows were seen at all the conferences this spring. Here H. W. Masquelier, R. C. Cole and Bob Kinslow of Westinghouse discuss common goals**

Westinghouse's E. G. Noyes and J. D. Davidson reduced station automation into four basic areas. (1) Select and develop the application of analog and digital sensing elements. (2) Develop independent subcontrol loops for critical turbine and generator functions. (3) Establish operating logic suitable for computer programming covering all operating conditions. (4) Establishing reasonable limits for the critical turbine-generator unit variables to assure long life of the equipment.

Looking at the application of computers to system operation and dispatching, B. H. Baldridge, Daystrom Inc., indicated that advantages of speed versatility and accuracy associated with digital computer should surely give it a more desirable tool for the system dispatching function.

### Automated Hydro

Looking at the automated hydro plant from the point of view of reliability, J. H. Bean, Southern California Edison, pointed out that the designer is faced with a problem of which functions to automate, how far to go and what type of equipment would lend itself to unattended automatic operation. He concluded that a careful selection of the kind of equipment installed in an automatic station would give the whole station a degree of reliability equal to that of the hydro units themselves.

Two interesting papers on the application of epoxy resins were presented. One by E. F. Bladholm, Southern California Edison, presented company experience in the application of a total of 14 epoxy coatings to worn or deteriorated parts. He indicated that the application of epoxy compounds for cavitation under a large release valve at Hoover Power plant may point the way to a low-cost solution.

Also on the subject of epoxy resins, Jake Hoeksema, PG and E, indicated that epoxy resins bonded effectively to old or new concrete. His favorable characterization of the epoxies appears to make them a sound approach to the repair of deteriorated concrete, even though the compounds themselves are expensive.

### Electronic

Pacific Gas and Electric Co.'s Al Worthington presented the electronics group with his company's work in arriving at work load units for operating and maintenance of various electronic components. This is a particularly worth-while effort—something that has needed doing for a long while. According to the PG and E studies, best ratio of work load to available man power is to operate with an approximate 10% backlog. An increased backlog tends to reduce the cost but at the cost of services and outages.

Southern California Edison's Ken Dueker discussed the operation of microwave TV control for their Mammoth Pool power plant. The system includes voice communication, telemetering, load frequency control, supervisory control and remote television viewing for operation, as well as for general surveillance. The operating and maintenance problems encountered in this first TV-controlled plant were discussed.

A trio of Calgary Power engineers, Harold Randle, Thomas Cardell and Malcom Clark, described their highly automated power system and the information gained from some 14 years of successful operation. The Calgary system makes heavy use of leased cable circuits for control channels, and in some cases space radio. Added security for supervisory is obtained through the extensive use of tones with guards to monitor the channel condition.

### Line Construction

That they must convince utility company managements of the advantages to them of contracting out not only transmission lines but a good deal of distribution line and maintenance work was the advice given to the tri-district meeting of NECA in San Francisco by Gordon S. Heylin, Line Construction Division of NECA, of Utilities Construction Co. Inc., Jenkintown, Pa.

The advantages that he quoted to make contractors more and more a part of their construction forces on a more permanent basis were that the utility, if it really analyzed its overhead costs, would find contracting out advantageous. The utility would not have to carry overhead items such as hiring, insurance, retirement funds, legal, pay roll, stores, engineering department expenses nor have to carry increased personnel and line equipment, have retirement plans. It would not have adverse public relations if it had to lay off line forces.

He urged contractors to set themselves up sufficiently well to offer utilities a packaged deal that would headquarter their work forces in whatever work area the utility required, to do the warehousing in the work area, to eliminate travel time and the boarding of crews.

In reviewing the labor situation for the Rocky Mountain Electrical League Spring Conference, James G. Howell, director of negotiations of the Mountain States Employers Council, presented a rather gloomy view of the inflationary wage demand situation with no cessation in sight of labor's demands for constant increases. Particularly under the Kennedy administration, which is labor oriented, the monopoly power of the unions makes business powerless to stop the wage push.

**UTAH CHAPTER, IAEI, officers re-elected for another year: W. T. Haws, Provo, secretary-treasurer; V. C. DuVander, Salt Lake City, first vice chairman; F. A. Bradshaw, Layton, second vice chairman; J. A. Clinger, Orem, chairman, state contractor board inspector**

# . . . in Electrical Inspection

Meetings of the International Association of Electrical Inspectors are an "education" in any sense of the word. This year, the annual meeting of the chapters in the Great Basin (Nevada at Ely on May 6 and Utah at Salt Lake City on May 8) looked well beyond minimum requirements of NECode and local ordinances.

Chester Elliot, engineer, spoke to the Nevada session on "Better Electrical Plans and Specifications." His premise was that poor plans furthered the operation of Gresham's Law, parodied as: "Poor contracting tends to drive good contracting out of circulation." After pointing out how biased interests (equipment salesmen and contractors) are responsible for much of the mechanical and electrical plans, he listed the elements of good plans and specifications. Acceptance of his standards depends upon educating the public to their value and of requiring plans to be drawn and checked by licensed personnel.

In his talk on wiring for hazardous locations, Crouse-Hinds' J. R. Petree urged those attending the Salt Lake City session to study the latest bulletins of NFPA and NBFU. Of necessity, NECode is limited to methods. Specifications for occupancies come from the others.

Later in the morning Frank Stetka, NFPA, Chicago, outlined code changes and wiring standards under development.

The problems of educating the inspector to his job, and the public to the inspector, received considerable attention in both chapters. While efforts for inspector legislation have been unsuccessful in the past, resolutions and instructions called for continued work toward state licensing of journeymen and contractors in Nevada and state licensing of inspectors in Utah. It also was suggested in Ely that proposals be made to require qualified engineers on architects' staffs.

Prof. I. J. Sandorf, Reno, gave the Nevada group a comprehensive report of the educational program being developed by the Southwestern Section. The material is intended to provide information on elements of electricity, for benefit of those inspectors who come from a nonelectrical background. Stock diagrams on NECode problems are planned for slide presentation. Workings of inspection offices are covered by sections dealing with suggested forms and procedures, together with some practical pointers on public relations. Following Sandorf, L. E. LaFehr, section secretary, said the program had attracted national interest. Tentative plans, however, call for a controlled distribution on a loan basis.

In his report to Utah Chapter, Chairman Clinger suggested adoption of a general educational program for inspectors and formation of a coordinating committee for all local segments of the electrical industry. Hal Morr, past association president, expressed his belief that Clinger's educational program would prove too burdensome for any one chapter and mentioned a possibility of using Southwestern Section's developments.

Code discussions tended toward the interpretative rather than the amendatory. Strong opinions were expressed relative to service equipment proportions with respect to house size. Inspection authority practice of requiring wiring modernization, beyond that needed for loads then being added, came in for criticism — and defense. Southwestern Section President Arthur P. Vesco warned the Ely group not to think so far into the future that needs of present ownership are overlooked.

In Salt Lake City, Karl S. Geiges (Underwriters' Laboratories) suggested that inspectors re-examine their wishes for absolute noninterchangeability of circuit breakers. Morr opined that an inspector should not get involved in designs beyond call of his local ordinances.

In keeping with its policy of moving the annual meetings about the state, Nevada Chapter chose Las Vegas for the 1962 section city. Officers elected were: chairman, Pat Doherty, superintendent of building, Henderson; vice chairman, Ralph Bisset, electrical inspector, Reno; and secretary-treasurer, Don Norton, city inspector, North Las Vegas.

Utah Chapter broke tradition and re-elected its entire slate of officers. They are: chairman, J. A. Clinger, investigator for state department of contractors, Provo division; first vice chairman, V. C. DuVander, Utah Power & Light Co., Salt Lake City; second vice chairman, F. A. Bradshaw, city inspector, Layton; and secretary-treasurer, W. T. Haws, electrical inspector, Provo. General chairman of the meeting was Amos Bronson, General Electric Supply Co. He was assisted by a representative electrical cross section of the area.

Registration for the day sessions in Ely totaled 43. More than 60 badges were issued in Salt Lake City.

**NEVADA CHAPTER, IAEI, officers: Pat Doherty, Henderson, chairman; Ralph Bisset, Reno, vice chairman; Don Norton, North Las Vegas, secretary-treasurer, at Ely state-wide meeting**

# . . . in Illuminating Engineering

FOUNTAINHEAD RESEARCHERS from IERI and IES Dr. Blackwell, C. C. Crouch

Dr. Glenn Fry and Willard Allphin

Charles Gibson and Dr. Harry Helson

Foster K. Sampson and Prof. Everett Strong

Two different approaches brought variety to the annual conferences of the three regions of the Illuminating Engineering Society in the West this year. Research as a basic fundamental was heavily stressed at the Sacramento regional conference of the South Pacific Coast region, May 3-5, when a compact symposium by the nation's top research men was brought to the conference from the Illuminating Engineering Research Institute by Charles D. Gibson, program chairman, chief, Division of School Planning for the State of California. To maintain the high research and technical approach even the application interpretations were thus given by engineers and architects. The commercial was held very much in the background.

On the other hand, the Intermountain Regional Technical Conference at Salt Lake City, May 1 and 2, and the Pacific Northwest Regional held at Harrison Hot Springs, British Columbia, May 8 and 9, followed the more traditional pattern, with speakers from some of the prominent national manufacturing companies. These speakers reported progress in illumination more from the application level, one perhaps better understood by the majority of the membership.

But at Sacramento Charles Gibson was trying to prove a point. Ever critical of the constant commercial pressure for more foot-candles and lighting equipment, he wanted to emphasize to the membership and to the professions associated with the use of lighting, particularly architects and consulting engineers, the research basis for IES lighting-recommended practices and particularly to emphasize the need for the quality aspect rather than quantity.

With a theme "From Research to Technology to Application in Visual Engineering" an imposing cast of researchers was brought to testify. A record registration and attendance for the region's conference, 413 total, of which 343 were registered, included many architects, engineers, public officials and members of the optical professions.

The cast included Dr. H. R. Blackwell himself, director of the Institute for Research in Vision, Ohio State University, whose research into the amount of light necessary for seeing caused an upward revision of all IES recommended practices. Also included was Dr. Glenn Fry, director, School of Optometry, Ohio State; Prof. E. M. Strong, Cornell University; Dr. Harry Helson, professor of psychology, University of Texas; John Chorlton, chairman of the IES school lighting committee, superintendent of building maintenance and operation, Toronto city schools; C. L. Crouch, technical director of IES and secretary of IERI. Also representing IERI was A. F. Wakefield, chairman of its board of trustees; Henry L. Wright, FAIA, first vice president of AIA and a trustee of IERI; Willard Allphin, illuminating research engineer, Sylvania Electric Products, and member of the technical advisory committee on light and vision, IERI; Foster K. Sampson, consulting electrical engineer and member of the IES school lighting committee; Dr. Karl Freund, president of Photo Research Corp., maker of high precision photometric testing equipment; and C. W. Macy, retired lighting consultant, formerly PG and E.

### Honor to the Backer

O. R. Doerr, vice president in charge of sales, Pacific Gas and Electric Co., was presented a certificate of commendation by Chairman Wakefield for his distinguished service in the financing of the research institute at the final luncheon.

The two architects on the program, Henry L. Wright and C. M. Deasy, related the coordination needed between the work of illumination research and the designer of architecture. Wright has been a liaison representative of AIA to the IES and particularly in the school lighting committee.

At a luncheon address Architect Deasy provided a good humored keynote. He particularly stressed the human side of lighting, which must not be overlooked and can seldom, if ever, be mathematically rated. He reminded that architecture is for people, not mere creation of a perfect building. Hence, lighting, like every other function, must be equated with people.

"None of my clients is a statistic. No one wants to be exposed to a statistical norm. He wants to be considered for his own personal psyche. If this is not rational, we are dealing with people and they are not rational. Lighting is not so much a technical problem; it is a human one. If you could provide

me with a handbook that would tell me how to design in such a way as to keep people happy you could keep all your curves and tables. I can tell you right now you won't solve any of these human problems with a goniometer."

To wrap up in one single package the significance of the Sacramento conference, it was that glare, or stray light entering the eye from whatever source or cause, is the problem.

While Dr. Blackwell described in detail the original research into the amount of light in foot-candles found to be needed for various seeing tasks, he described also a new research he is now conducting into the polarizing of the light as a means of reducing the stray light which causes glare. In this he found that, with light polarized in a vertical plane, ability to distinguish contrast, which amounts to seeing, is greatly increased and lighting levels need not be so high.

C. L. Crouch described the application of Blackwell's and others' findings by IES committees to various fields of seeing in residences, offices, schools and factories. Out of these he described how the recommended lighting practices are derived.

E. M. Strong, working with R. G. Hopkinson of England, is researching into the glare effects from large luminous areas—large window walls, in modern architecture, or luminous ceilings or walls. He, too, stressed the need for better understanding between architects and illuminating engineers and said that university campuses are beginning to remove the walls between the two branches of learning. This cooperation is particularly necessary with the modern use of glass and large-area lighting sources.

Foster Sampson illustrated the problem and the effect of it upon architectural design. It is changing the appearance of buildings where louvers, overhangs and other devices are used to control direct sunlight. The use of greyed low transmission glass, which allows occupants of a building to see outdoors without discomfort but reduces brightness of sky, clouds or outdoor scenes to comfortable levels, was emphasized in his talk and visually by examples that he pictured.

Other researchers, Dr. Fry, Willard Allphin and John Chorlton, all recounted details of the type of research they are doing. Dr. Fry is measuring eye behavior from light sources. Allphin is testing luminaire brightnesses in an office interior. Chorlton is studying glare conditions in schools and the effect of glare on the seeing of school tasks.

**LIGHT THE WAY: These IES officers in the Sacramento vision symposium: Roy H. Kreyser, regional vice president; C. D. Gibson, program chairman; Richard Slauer, IES president; Mel Fenton, general chairman; and Eldon Harris, Mother Lode chairman**

Karl Freund explained some of the precise light-measuring instruments he has manufactured from laboratory instruments developed by researchers such as Dan Finch, University of California, and the late Dr. Pritchard and others. Presently he makes available lightweight, easily portable, direct reading meters that can be taken anywhere for measurements of interior light and brightness. "It is better to take one small meter to your customer," he said, "than to take along 100 observers."

### The Public's Advocate

Charles Macy described himself as the one called in by the public when the lighting engineered and installed by others brought discomfort and, hence, complaints. He recounted many personal experiences and personal research both he and Foster Sampson have done in the field to check brightness and loss of visibility resulting from various types of fixtures.

Dr. Harry Helson reported on a study he has been making into colors for backgrounds and color contrasts preferred by people as used for interior decoration.

At each of the regional conferences IES President Richard Slauer gave an inspiring and human appeal to the members urging more leadership in lighting. "Leadership does not come out of the past; it does not exist because someone says it does; it will not occur by wishing," he declared. Then went on to elaborate. "Over three years ago Blackwell's report opened our eyes to new aspects of lighting practice. Yet we have not incorporated his findings in a single release in the industrial lighting field, a field where direct benefits would seem outstanding. Or, for example, our recommended practice of school lighting. Released in 1949, it represents the general thinking of 15 years ago. In the interim, we have built over a million classrooms in the United States and Canada. President Kennedy says the United States needs another 600,000 in the next 10 years. Not only is the Blackwell Report not recognized by an official society school document but all the work of the Illuminating Engineering Research Institute is unrecognized since its reports only started to appear as the text of our 'current' practice was being prepared in the mid-40s.

"We in the society are not doing wrong; but we are not doing right. We are not showing the way—we are not making our technical and social and moral leadership available for over 45 million school children in our two countries. Can we be said to be successful in our own chosen

**IES VEEPS: Lloyd Reed, Denver, greets his successor, Bob Godeman, Phoenix**

INTERMOUNTAIN CHAIRMEN Bill Bendorf, Arizona; Jim Watson, Rocky Mountain; J. E. Parker, Southern Colorado; Bill Huckins Jr., Utah; A. W. Boehning, New Mexico

INTERMOUNTAIN IES Chairmen Don R. Dyrenforth, Wayne F. Mulcock

field if we don't lead? I doubt it."

The conference at Sacramento was exceedingly well organized by the Mother Lode Section under the direction of Mel Fenton, Smoot-Holman Co., as regional conference chairman. Roy Kreyser, regional vice president, Los Angeles Department of Water & Power, and the chairman of the sections and chapters of the IES in the region, presided at the various meetings.

### Intermountain and Pacific Northwest

At both the other conferences traveling experts from national manufacturers on a tour of the regional conferences addressed the meeting. President Slauer was the most faithful attender, not only of the general conference, but of all committee and special meetings. C. L. Crouch, technical director, attended both the Intermountain and the South Pacific Coast meetings. Willard Allphin attended all three. From General Electric Lamp Department, Cleveland, Robert T. Dorsey, supervisor, commercial lighting applications, gave talks at the Northwest and the Intermountain meetings, both on "new light sources and their applications" and "exterior lighting practice for the '60s." Harold A. Van Dusen Jr., development engineer, Line Material Industries, Milwaukee, likewise addressed both on "factors affecting the efficiency of street lighting systems." G. G. Rae, sales manager, Holophane Co., New York City, spoke at both on "Five Factors in Modern Office Lighting Design." In each of the three, of course, the finals in the contest for regional winners of both the Class 1 residential and Class 2 commercial applied lighting competitions were run off.

With slides showing product developments and applications, Dorsey declared that, where so many developments are made in so short a time, changes in application techniques must match. People are not concerned with lamps or fixtures as such but with the end results. Hence the tools to achieve the lighting should be inconspicuous and designed to get results rather than to show off an array of fixtures. The cost of lighting is small compared to wages, he also said. He suggested further that nomenclature be changed so that desirable levels could be rated in quantitative standards other than foot-candles because people seem to be frightened by high numbers. He suggested a rating scale of 10 instead of speaking in terms of 100 to 1,000 foot-candles.

He displayed a new flat, square, 12x12-in. fluorescent lamp used with a remote ballast, which may well prove a versatile change in architectural treatment of light. He likewise showed recent developments in combinations of lighting equipment incorporating sonic, thermal and acoustical needs of a building within them.

In his street lighting and outdoor lighting talk he illustrated many trends in use of fluorescent and color-corrected mercury equipment for outdoor areas, streets and highways.

Harold Van Dusen maintained that ideal roadway illumination should provide very even intensities over the complete roadway, an ideal not yet realizable but being approached. He thought that it could better be done by incandescent rather than fluorescent or mercury lamps as he compared series and multiple circuit systems. The theoretical gains using high luminous efficiency gas discharge light sources, he said, are not being utilized in present roadway practices. This provides an opportunity for equipment manufacturers to improve the efficiency through better optical designs. Better ballast designs are likewise needed, he declared.

Using catchy titles for the five factors in modern office lighting design that should be considered, G G. Rae named them as follows:

"Father Knows Best"—that individual interests should not dominate design but that the desires of the whole group affected should be considered.

"Theirs Not to Reason Why"—a better understanding of products and their applications and of lighting objectives is essential for selling.

"The Eagle in the Bird Cage"—importance of a single lighting factor should not be stressed at the sacrifice of over-all results.

"The House With Nobody in It"—installation should be designed for comfort rather than to promote admiration.

"I Can't Afford the Economy Size"—designers should promote plus value lighting through quality equipment. While it costs more, it is more than justified by the extra advantages.

The Salt Lake conference, co-hairmanned by Wayne F. Mulcock and Donald R. Dyrenforth, and with the host section chairman W. A. Huckins Jr. presiding, had a registration of 130, considered very high for the region. L. S. Reed, regional vice president from Denver, was conducting his last conference of the two-year term.

Speakers from the region included

(*Continued on p* 96)

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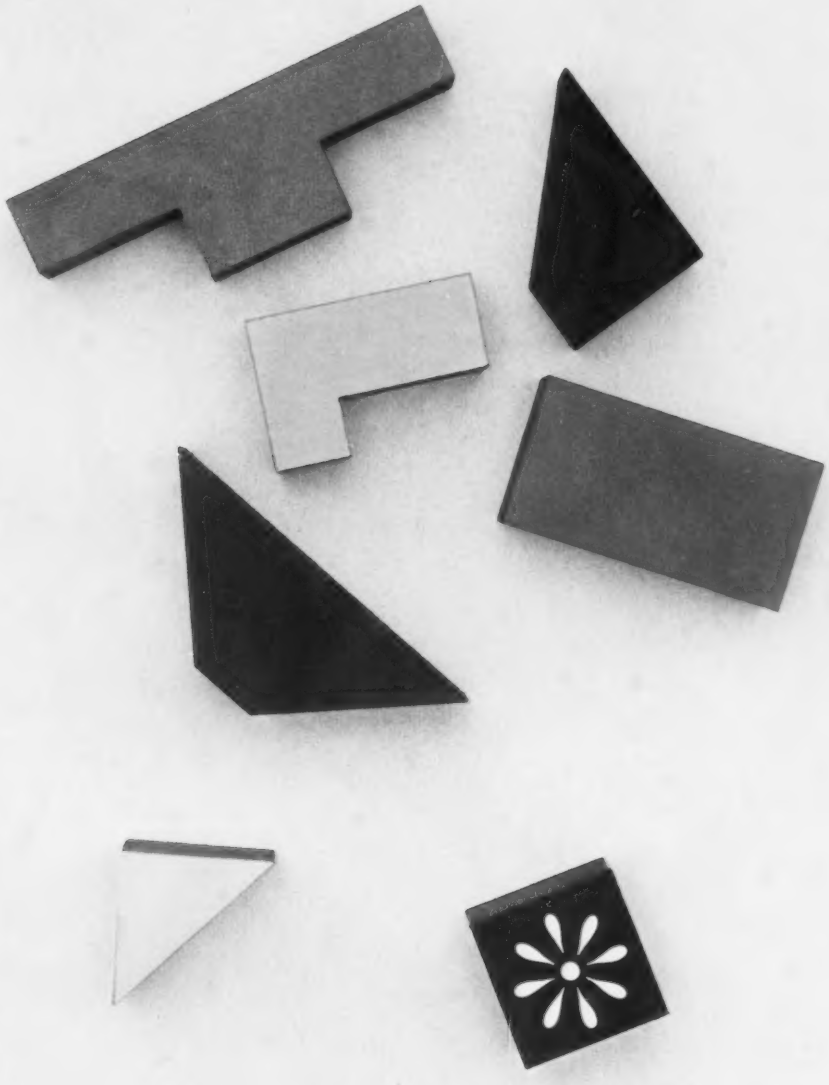

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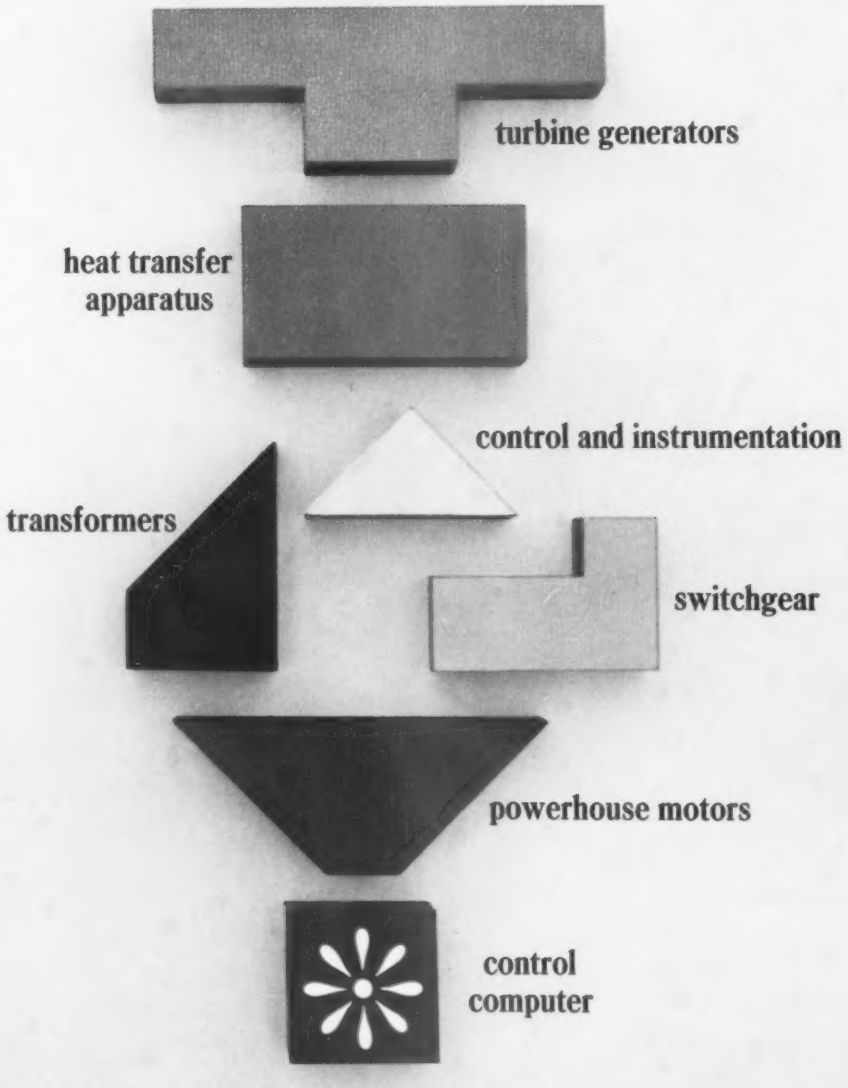


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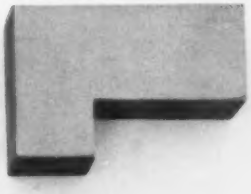
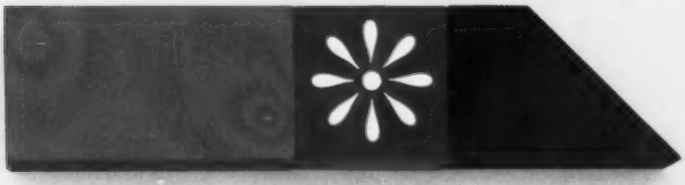
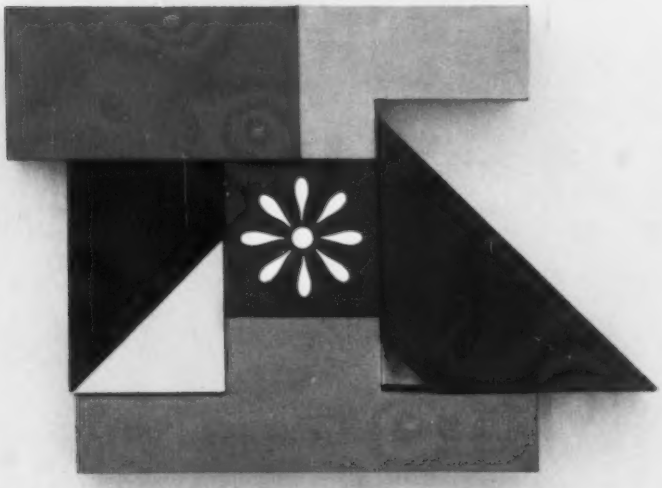


or any group of equipment...



or all equipment including associated auxiliaries.



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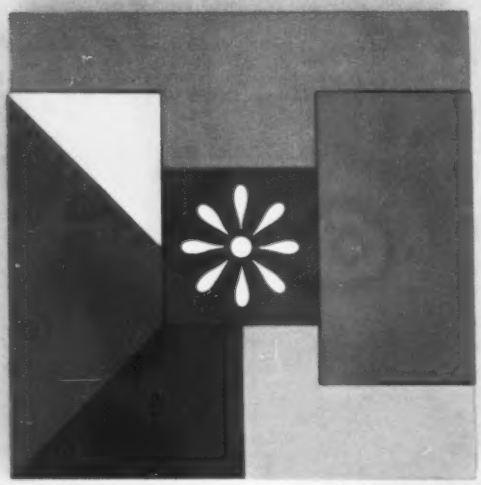

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**"OPERATION KNOW-HOW": Discussing educational courses: R. Anderson, Paul Briggs, L. M. Stewart, Ralph Ecker, Robert Wilkinson**

# . . . in Electrical Contracting

If ever a conference admonished its members to change their ways, the tri-district (6, 8 and 9) convention of National Electrical Contractors Assn. at San Francisco April 26-29 was the most vehement. Both the leadership of NECA, from Paul Geary, executive vice president, on down, and the cold hard facts, spoke this warning in strong tones.

As he has done for the past several such district conferences and in as many national conventions too, Geary warned contractors that their market, based on a captive union business, was being eroded both by changes in labor law and in the public's methods of getting its work done. The facts were faced up to them in a series of charts and a talk presented by Joe Felber of the national staff. They were cruel in their depiction of the growth in the over-all market for electrical construction but with a decline in percentage of it being done either by IBEW union labor or employing NECA contractors. While they still lead in dollar volume, in percentage they have been losing position each year, Felber showed. In 1954 NECA contractors were doing 30% of the total electrical volume, in 1960 only 18.2. Of the controlled or protected market in 1954 they did 54% and now it is down to 30%.

Market surveys conducted in three Western markets by NECA staff members and chapter managers in Salt Lake City, Seattle and San Mateo supported the national figures.

The contractors' annual conferences are a "joint venture" of the three Western districts — District 6, Oregon, Washington and Alaska; District 8, Montana, Idaho, Wyoming, Colorado and Utah; District 9, California, Nevada and Hawaii. The first day is given to individual district meetings to review their wage negotiations, regional legislative and operating problems. Then joint sessions of all three hear of the NECA national programs.

### Aim at Selling

Most significant part of the four-day conference was this urgent admonishing of them to change aims toward a vigorous selling program instead of union dependence. Another vitally interesting item, to contractors, was the antitrust law panel discussing various aspects of bid depository operation and association activity. A third was a beginning to care about what the other branches of the industry might think of NECA or how they might help it to solve some of its problems. This attitude once was strong in NECA's "Electragist" days but of recent years only what the unions thought or did seemed to matter. The surveys in each of the three Western cities indicated a need for better coordination with the rest of the electrical industry, with architects and engineers and the public.

Field Representatives Floyd Shipp and Dexter Jewett both urged other chapter areas to make similar com-

**ANTITRUST PANEL: Lyle Jones, U. S. Department of Justice; Ed Pewett, NECA counsel, and Walter Howland, California assistant attorney general**

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### AN ARCHITECT SUMMARIZES PANEL DISCUSSION

**"I am impressed that the construction industry is now so complicated that it provides many loopholes and hiding places for scoundrels. The honest men of integrity must compete with these. Legislation, rules, contracts, etc., cannot solve the problem—because such documents become a challenge to find new loopholes. 'Beating them at their own game' only compounds the problem. Whatever else we do, we must, each of us, maintain our own integrity. The key word is integrity. At the same time, we must seek to find specific cures to specific ills. Remember, the price of liberty is eternal vigilance; and this includes the liberty to practice our several trades. But the basis of establishing a sound business practice is personal integrity. By this I mean not mere honesty, but an attitude of assuming responsibility for our own actions; of not chiseling, of not weaseling; of not asking the other fellow to do what is unreasonable; of not taking unfair advantage, even though it may be quite legal."—*Richard S. Banwell.***

plete surveys of their market area as a means of knowing what is going on in the area and of being able to strengthen their own position relative to that market. Chapter Managers Robert Coleman, San Mateo, and A. R. Woolley, Salt Lake City, testified to the benefits they felt accrued from their surveys, which had revealed strong weaknesses in their positions. Each survey showed a definite need for supplementary labor agreements for residential and for maintenance and repair work that is evidently by-passing NECA contractors.

Rex Moore, Sacramento contractor, illustrated the development of specialty business by citing the lighting maintenance contractors who sell a complete maintenance package on a maintained foot-candle basis, which includes fixtures, washing, lamp changes, etc.

Norman Ferguson, San Diego, District 9 vice president, admonished contractors to pick out one of the various markets available and to specialize in it, gaining more knowledge about it, what special tools are needed, train crews for it; and give it more efficient handling and supervision.

What the lighting market offered was presented by J. B. Foley, manager, commercial and industrial sales, General Electric Lamp Department (see Lighting).

Testifying to the value personally of the NECA educational courses conducted in the Inland Empire Chapter, a panel consisting of Robert Wilkinson, chapter manager, R. Anderson, L. M. Stewart, P. Briggs and R. Ecker reviewed the imposing list of courses totaling more than 8,000 hours engaged in by themselves and other members. A course in reading, two in lighting, accounting, two in estimating, two in job management, a job management workshop, a foremen's institute, two estimating workshops, a negotiated job institute for sales training, one on employee relations, an overhead workshop, a self-appraisal and organization workshop have been conducted by this active chapter. As the result of a survey of the accounting methods used by members by Jack Sullivan of the NECA staff, the group has asked for a re-survey and for a modification of the NECA accounting practices handbook.

**CONSTRUCTION INDUSTRY PANEL: Standing — Fred Wider, general chairman; Bennett Raffin, AGC; Howard Bayley, District 6 vice president; Glenn Smith, electrical engineer; Tom Simonson, mechanical engineer. Seated — Charles Kahrs, architect; Al Lera, electrical contractor; Richard Banwell, architect, who served as panel moderator**

#### Drive for Better Image

Aroused by the results of the survey in its area, as well as by a questionnaire sent to engineers and architects, the Puget Sound Chapter, according to Walter V. Anderson, its president, has started on a campaign to "turn the tide" and to create a better image for the NECA contractors. This is taking the form of a series of advertisements to sell the buyers on the qualifications of NECA contractors; not to sell down nonmembers. Direct contact through a field representative with the engineers and architects and general contractors is being maintained to improve relationships and a film-strip talk is being presented to business clubs.

The interest of electrical contractors in the National Electrical Code and its formation was presented first by Sid Hill, Los Angeles, member of NECA codes and standards committee, and by R. W. Osborne, vice president of District 7, who is chairman of the NECA committee. Both made a plea for support of better pay for electrical inspectors in order to obtain professional-type men with good training and education.

In a panel in which the members were to "let their hair down" discussing problems between each other in the construction industry, Richard S. Banwell, architect, was panel moderator, with Charles R. Kahrs of the same firm, Reid, Rockwell, Banwell & Tarics, as a participant; Glenn W. Smith, electrical consulting engineer; Thomas R. Simonson, consulting mechanical engineer; Bennett L. Raffin, AGC general contractor; and A. P. Lera, Lemoge Electric Co. as participants. Bandied about were the topics of withheld payments, unspecific plans and specifications, substitutions of materials or fixtures, ultimate responsibility, segregating of contracts and other familiar problems. At the end architect Banwell made the excellent summary contained in the accompanying box.

Pressure from members to "do something about it" may tempt associations out into dangerous antitrust quicksands but they should avoid it at all costs, the NECA tri-district meeting was told seriously and soberly by an antitrust panel moderated by the NECA general

counsel Ed Pewett, himself a former Department of Justice trust department lawyer. Telling of federal laws and the danger grounds of violation were Lyle Jones, antitrust attorney, chief of the San Francisco office of the Antitrust Division of the U. S. Department of Justice, and Wallace Howland, chief antitrust attorney for the State of California and a former USDJ man. Each went into the intricacies of the interpretations of the respective federal and state laws that parallel each other and indeed both may be brought to bear on the same violations. Jones listed activities that violate to include monopolies that exclude others from business, price fixing by any combination which tampers with prices, allocation of markets or customers, boycotts or agreements not to deal with someone.

### Look at Bid Depositories

Bid depositories came under particular scrutiny, 28 of the recent cases involving them. Lyle Jones listed 12 criteria for judging whether bid depositories may be illegal. These are: the size and kind of the group, past behavior of the parties, structure of the trade, accessibility to all, that it is completely voluntary, fees are not collected in excess of operating cost, that there are no penalties for infractions, that they are run by persons not connected with the trade, that bids are open to the public, that withdrawal of bids is made only if errors are found, that the stipulations against bidding are not restrictive and the sanctions are public opinion only.

Howland gave two simple tests which he declared "corny American principles": (1) That two against one isn't fair. You can't gang up on someone. (2) A big man can't push a little man around. "If it isn't fair in the good old American sense, it is apt to be in violation," he said. He elaborated to say that not all bid depositories are unlawful *per se* and usually only when they add to them some rules or restrictions. If they function for information only they can be lawful and in the public interest. Of the 28 cases, 10 in California and Nevada, previously mentioned, all but one, he said, involved some degree of price fixing arrangement. A depository constitutes a temptation, for its operation is too handy a vehicle with which to put on a fix.

Howland told of several bills introduced by the California attorney general to strengthen state antitrust action.

The question and answer session was a lively one with the two antitrust men warning of dangerous grounds in such matters as expulsion of members, liquidated damages, "post-mortems" or surveys after a job has been let, complimentry bidding, pricing services, closed specifications, union agreements in conjunction with depositories, statutes of limitations, treble damage suits, what determines a civil or a criminal action, discussion of credit information. The antitrusters, however, ducked the question of lawyers' fee schedules, doctors' fees, liquor and milk price fixing by the state, saying only that some of these involved "political policy."

### Discuss Labor Problems

Saturday seemed to be labor day. It was the day in which the electrical contractors' major problem, labor, which consumes the most time and energy, came up for review.

Charles Scholibo, director, Western Region for NECA, reviewed the various new types of operation with which contractors and IBEW both have to compete nowadays – electronic marine line work, motors and control, appliance repair, modernization and residential. At missile sites, he said, it was further complicated because some of the weaponry and facilities were supplied by the telephone company, by utilities, by missile manufacturers, by communications manufacturers and by computer manufacturers, each with its own technical personnel. If either or both the contractors and the union are to get some of this work they must set up separate sections for these specialties in their agreements, limit these to the scope of work in particular fields and then proceed to get trained people in those fields with which to supply their contracts. "If the Bacon-Davis Act were repealed would either the contractors or IBEW," he asked, "be able to convince the public that they are the ones that should be doing even the work that they now do? We must place ourselves in a proper competitive position to take this work and train men for it."

However, neither Charles Foehn, vice president, IBEW District 9, nor Lee Anderson, vice president, District 8, seem to pay much heed to this urgent appeal by the contractors. Both talked in general terms of creating better understanding and of discussing their problems in joint labor-management committees even before bidding complicated jobs.

In the resolutions passed at the end of the meeting the first asked NECA and IBEW to hold a "summit conference" and explore causes and make recommendations for corrective measures to improve the ability of both to serve the several markets in which contractors are not getting the construction business; to develop customer relations for both union and NECA and to increase their share of the market.

### Material and Pensions

Another resolution recommended a standard in specifications of a strong material clause stating specifically what the contractor must do to prove that an item is equal to the material specified. Another asked that the feasibility study being made by NECA and IBEW to determine how the national pension plan may be improved be speeded up because of the numerous demands for local pension plans. Another advocated putting into the field a dynamic public relations man to contact various government agencies and procurement offices to sell the ability of NECA contractors to perform in the complex fields of electronics and communications.

In the decision for the next meeting place Charles Berrell, Salt Lake City, NECA District 8 vice president, deferred until 1963 the holding of the meeting in that region so that Howard Bayley, vice president, District 6, might schedule it coincident with the world's fair "Century 21" in Seattle on July 17-21, 1962, with the limiting of business sessions to the mornings so that families attending could spend the afternoons and evenings at the fair. A plaque commemorating his service as regional vice president from 1954 to 1960 was presented for President Harold Webster by Vice President Geary to W. R. Grasle of Portland and he was also presented a camera outfit by District 6.

### High Praise for Varley

Throughout the convention high praise was accorded William J. Varley, until recently manager of the San Francisco Electrical Contractors Assn. and now Electrical Industry Fund coordinator, for his long service to the NECA throughout the years and particularly for jumping in, upon the illness of Robert Frank, to complete convention arrangements. Fred Wider of San Francisco, general chairman, and Emil J. Weber, president of the San Francisco Chapter, were likewise honored.

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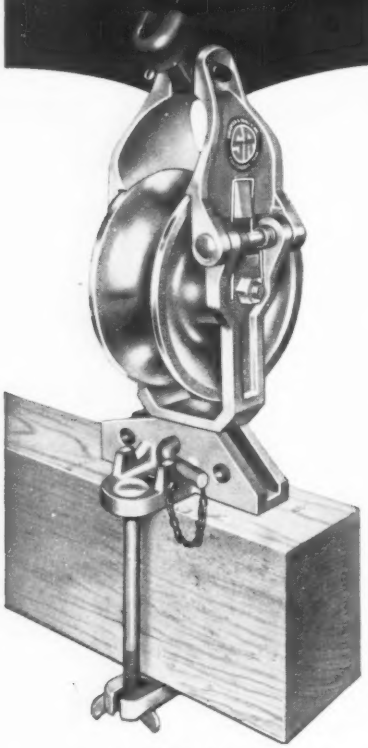

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## LIGHTING

*Continued from page* 88

Walter L. Haspedis, vice president, Columbia Lighting, Spokane, who spoke on lighting troffers combining air circulation in a number of varying designs; James C. Ramsey, manager, Western regional sales, Day-Brite Lighting Inc., Santa Clara, who discussed contemporary lighting and architecture, urging more imagination to avoid blandness and sterile designs; Ariel Davis, president of a dimmer manufacturing company in Salt Lake City, who discussed the new solid state dimmers for use in theaters and other lighting installations. To talk on the ballast problem M. E. Robertson, manager, commercial engineering, Jefferson Electric Co., Bellwood, Ill., appeared.

While reports from the Pacific Northwest regional conference at Harrison Hot Springs had not been received at press time, many of the speakers already mentioned were on the program. The conference there was under the general chairmanship of Ernest Adams with Jack T. Coddingham, Portland General Electric Co., as Pacific Northwest regional vice president. On Monday, May 8, two programmed items not previously reported were a talk on residential lighting by Dorothy McGregor, B. C. Electric Co. Ltd., and H. N. Semmens, architect of Vancouver, entitled "Light for Living." After tea in the afternoon Beverly A. Travis, consulting engineer and past regional vice president, described the lighting being designed for the Century 21 exposition in Seattle next year for which he is the consulting engineer.

Tuesday was distinguished by having a panel discussion on school lighting following a talk by John Chorlton. On the panel were Alan B. Wilson, architect; John Chorlton; R. C. B. Jarvis, consulting engineer; and Howard C. Hall, Seattle optometrist. Presenting a talk on recent developments in airport lighting was M. J. McAuliffe, Canadian Westinghouse Co.

At the Pacific Coast Electrical Assn. Business Development Section meeting in San Francisco the commercial-industrial lighting committee sought to formulate a new sales aid program for selling the relighting market. It would incorporate visual aids such as data sheets, slides, before and after job histories, job estimate sheets and statistical data. A sound tape would be recorded to be used in conjunction with a group of slides.

This package would be available to contractors, utility people, manufacturers' representatives, electrical distributors and others in the industry for public presentation. Dudley Moore, Benjamin Electric Division, Thomas Industries, presented such a package together with Roy Dahlin, Southern California Edison Co., and Stan Howatt, Pacific Gas and Electric. Arrangements were also announced to supply ELECTRICAL WEST with a data sheet to be published periodically and which could be incorporated in the sales aid package. Fred J. Bertolone is chairman of the committee.

In the residential lighting committee the "Light for Living Program," conducted by Pacific Gas and Electric, was reviewed. It was presented to over 180,000 people through the media of 12 demonstration homes during the past year, according to Robert Haskell.

Also discussed were ways and means, if possible, of obtaining good fixtures for PCEA members in their homes as demonstration means for the public. Arizona Public Service has such an employee plan in operation.

Joe Kuck of Hawaiian Electric described the Academy of Lighting Arts program carried out by means of residential "block parties" in new residential districts. Lighted gardens and visits to model homes were part of the program.

Use of infrared heat lamps around pools to provide heat and extend the swimming season was also described as a possibility for loadbuilding. The residential lighting chairman was A. O. Grotenhuis of Thomas Industries with J. Walter Howard of General Electric Lamp Department, co-chairman.

NECA contractors were shown graphically by J. P. Foley, manager, commercial and industrial sales, General Electric Co. Lamp Department of Cleveland, the opportunity for a real selling program by contractors at the tri-district meeting in San Francisco. Of opportunities he cited the new light sources, the new control mechanisms for lighting, the new basic knowledge of the performance of the human eye, the impact of this on the lighting market, the growing documentation of user benefits and the more favorable reaction now from the public. With lighting just a part of what he called "the electrical space conditioning," he urged contractors to apply themselves to undertaking the entire package of an integrated lighting, heating, air conditioning, sound and acoustical environment.

## Load Building

*Continued from page 77*

Willis, vice president of Arizona Public Service.

Doerr said that since Jack Ross had presented the PG and E program at the Electric Club joint luncheon previously, he would comment only on some aspects. Answering the question as to why so much of their time and effort was placed on the new home market, he said that, because of the terrific influx of population, reaching new homeowners first meant reaching most of the people who could be sold all-electric. He added that this would spread to other fields, particularly commercial.

McDaniel cited the advantages that his men have in being able to sell total electric with no holds barred and thus sell electricity by the houseful. The company has concentrated on the Bronze and Gold Medallion programs and now, with the reorganized electric league, is working with the Department of Water & Power and California Electric Power to bring results from straight electric promotion.

Phillips, noting customer resistance during the recession, said a need was felt for a new approach to keep sales up and rates down.

Arizona Public Service, said Kiedaisch, is making inroads into the home lighting modernization market by starting with the bathroom. High-rise apartment buildings were considered ideal for electric heat by several of the panel.

Of water heating promotion little was said. McDaniel claimed that there were still too many different types and sizes.

Other topics discussed were high bills, the difficulty of selling existing homes on modernization, outdoor lighting and street lighting promotion, contractor and dealer relations, wiring allowances and underground distribution.

Phillips stated that the kitchen section of the Bureau of Home Appliances in San Diego had been the best means of getting home modernization accomplished, using its "Kitchen Seal of Approval" as its appeal.

Of underground distribution McDaniel said that utilities were not doing enough to get developers to install more underground systems or to get their systems simplified for easier and more economical installation. Kiedaisch said that his company had some test subdivisions being studied at the present time.


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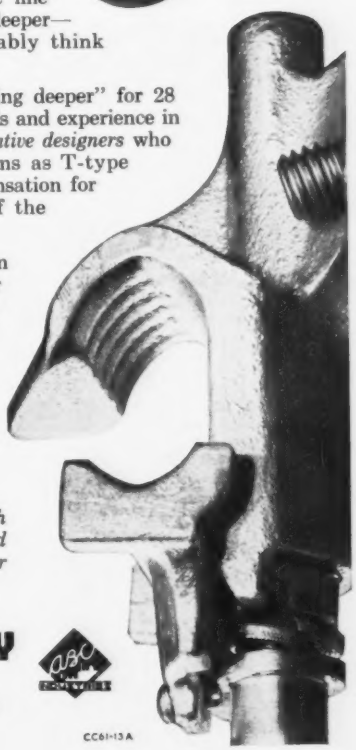

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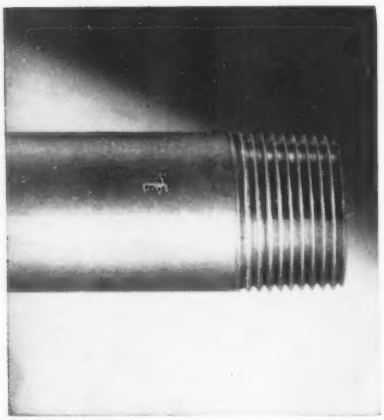

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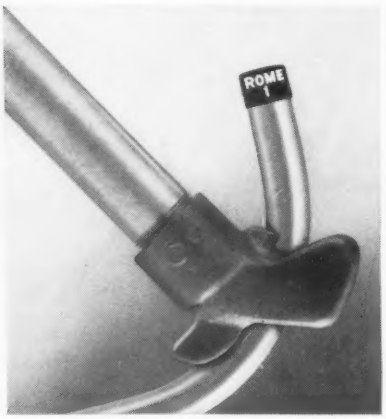
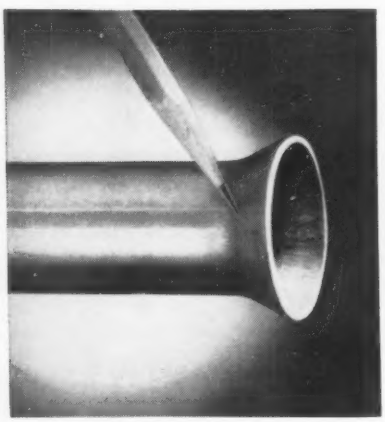


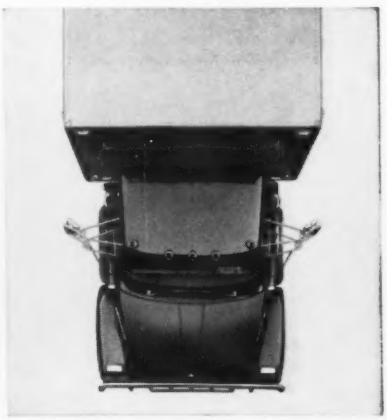

**EASY BENDING.** Uniformity of the conduit wall, due to **controlled annealing** before galvanizing, makes Rome conduit easy to bend accurately.

**EASY SIZE IDENTIFICATION.** Each length is identified by color-coded, size-imprinted thread protectors . . . and, in addition, the size is imprinted on the tube itself.



**UNBREAKABLE WELD.** Uniform edges, bonded by electrical resistance welding, form a weld stronger than the pipe itself.

**EASY HANDLING.** Conduit is shipped in one-ton bundles, subdivided into smaller bundles for easy handling on the job site.



**CONVENIENT DELIVERY.** Fast, efficient shipment to the job site from your nearby Rome Cable electrical distributor.

For more information on Rome rigid steel conduit, write for Bulletin RCP-940, or ask for a sample. Rome Cable Division of Alcoa, Dept. 4-51, Torrance, Calif.

ALCOA
ROME CABLE
DIVISION

*For phone number of closest representative see advertising index in back of book.*

# CONTRACTING & CONSTRUCTION SECTION

**STATISTICS / COSTS / PROPOSED PROJECTS / NEW PRODUCTS / NEWS**

## LATE NEWS FLASHES

### EASA National Convention Coming

Motor and apparatus service shop executives from all over the United States and Canada will converge on the Jack Tar in San Francisco, June 11-14, for the national convention and exhibit of the renamed Electrical Apparatus Service Assn. (formerly NISA). Programmed are talks by four top executives of major electrical manufacturers who do not run service shops of their own, five independent service shop owners, an equipment distributor and an office methods expert. Jack S. Van Alstyne, Sacramento, is general chairman. Among the speakers will be Westerners John C. Reed, Portland; Charles W. Doane, Los Angeles; and session chairmen will be Western shop owners.

### Lighting Progress Show Planned

Electric League of Southern California will sponsor its first Lighting Progress Exposition in the Hollywood Palladium, Oct. 3-5, seeking an attendance of 20,000 architects, builders, owners and managers, contractors, decorators, consulting and maintenance engineers and wholesalers. It will encompass exhibits of industrial, commercial and residential lighting products, with demonstrations. For the event the Palladium will have a modern face lifting and interior modernization. With an industry-wide advisory committee the show leaders are Roy Kreyser, IES regional vice president, Los Angeles Department of Water & Power; Roy Dahlin, Southern California Edison Co.; and Mel G. Kennedy, executive vice president of the Electric League. A. Howard Williams is show manager. It will be an invitational affair, with invitations sent to interested people in industry and the professions.

► For NECA convention report, see page 93.

Page 108 NEW PRODUCTS
ESTIMATOR'S GUIDE
118 PROPOSED WESTERN PROJECTS
117 READER SERVICE SECTION

# the difference in electrical cable starts on a fungus farm

Our Research and Development Department grows just about every kind of fungus you can find, and we do it for good reason . . . to make sure you get a better cable. Many of our cables are used in fungi-infested locations. We fight the fungi by including fungitoxic agents in the saturant for insulation tapes and sometimes in the insulating rubber compounds themselves. We can inhibit fungus growth or, where necessary, use even stronger toxicides to kill it completely. So we grow fungi to make sure that USS Tiger Brand cables will give you years of trouble-free service.

This is just one of the many ways our Research and Development Department makes sure the quality of USS Tiger Brand Wire and Cable is the best you can get. Our research laboratory tests all materials used in Tiger Brand products. We experiment with new materials and methods to make USS Tiger Brand Electrical Wire and Cable even better.

That's why, whatever the job, it pays to specify USS Tiger Brand Electrical Wire and Cable. You can't buy better cable. American Steel and Wire, Dept. 1164, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

USS and Tiger Brand are registered trademarks

**American Steel and Wire Division of United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad

# DEEP DEEP GROUNDING

## INSURES EXTRA PROTECTION

• Heat treated, alloy steel driving stud resists mushrooming — can be used over and over. Couplings of rugged Silicon Bronze.
• Completely machined point speeds driving. All rod sections are threaded on both ends for use as top, intermediate or bottom section.
O.S. BLACKBURN
Permanently Moist Soil

### Blackburn Sectional Rods Get Down Into The Permanently Moist Soil

Drive down to permanently moist soil that gives lower earth to rod resistance. Actual experience shows a few dollars invested in deep grounding has saved thousands of dollars in overhead burn-outs.

- BLACKBURN Sectional Rods have a uniform coating of highly conductive corrosion-resistant copper, molecularly bonded to *rigid steel core.*
- Driving studs and couplings interchangeable with all standard sectional ground rods.
- Available through Electrical Distributors.

**JASPER BLACKBURN CORPORATION**
1525 Woodson Rd., St. Louis 14, Mo.
WYdown 3-9430

**BLACKBURN** *Sectional* COPPER BONDED **GROUND RODS**


*For phone number of closest representative see advertising index in back of book.*

# MANUFACTURERS AND DISTRIBUTORS

Blundell

Read

Barnes

Stephens

## Personnel Changes at Maydwell & Hartzell

Personnel changes were announced May 1 by Maydwell & Hartzell.

Andrew C. Blundell, who has been vice president and regional manager in charge of the southern California-Arizona districts, becomes vice president-sales, replacing Dean P. Cady who has resigned. Blundell joined the organization in 1938 and, except for duty with the Air Force, has been with the company most of his business life.

To replace Blundell as regional manager, Charles B. Read will be transferred from the Arizona operation to Los Angeles. Read, who has been Arizona district manager, started with Maydwell & Hartzell in Los Angeles about 13 years ago and has worked through all phases of its sales operation.

Richard Barnes will replace Read as district manager in Phoenix. He formerly was with Arizona Public Service as an electrical engineer and for some years was active in outside sales engineering in the Arizona territory.

Edward J. Stephens has joined the organization as sales engineer in the southern California district, replacing Warren L. Manchester, who resigned. He has been in the electrical industry since 1952 as district manager and general sales manager in the electrical and cable fields.

► **Rome Cable Division** of Aluminum Co. of America has established a new special products facility at 2937 Tanager Ave. in East Los Angeles. The 40,000-sq-ft plant also serves as the firm's regional warehouse for electrical cables and assemblies. Robert D. Golly is general manager, operations.

► Earl S. Condon Co. incorporated May 1 under the name of **Earl S. Condon Co. Inc.** Officers are: Earl S. Condon, president; Charles Morris, vice president; Martin C. MacDonald, assistant treasurer; Charles Kelley, secretary-treasurer; J. R. Aitchison, assistant secretary. The company has represented electrical products manufacturers in southern California for the past 30 years. Among the lines handled are Burndy, Collyer, Lapp, Preformed Line Products, Slater Electric, Standard Electric Products.

► **I-T-E Circuit Breaker** Co. has outfitted a mobile trailer display for a year-long national tour. The truck, which contains operating breakers among other of the company's lines, took off from Los Angeles, stopping in Phoenix on the first leg of its eastward sweep.

► **Paul Fillinger** is now sales and marketing manager for Electro-Glass Laboratories at Portland.

► **General Electric** Co. has awarded a contract to George E. Tuefel Co. of Seattle for construction of a branch office, warehouse and sales center in the Andover Industrial Park at Tukwila, Wash., according to B. L. Heywood, Northwest District manager for G-E's Major Appliance Division. The new distribution center, comprising 122,400 sq ft of floor space, will be the first building in Andover Park, a 325-acre industrial area under development by Puget Western Inc. Plans call for a glass, steel and concrete building of one-story and mezzanine plan. The entire center will be raised on a 3-ft concrete recessed foundation.

► The consulting engineering firm of **Stevens & Conkling** has been formed by Jack D. Stevens, Roger L. Conkling and Robert C. Wilson. Offices are in Seattle and Portland. Stevens had been consulting engineer for the Puget Sound Utilities Council until he resigned March 31. Conkling, who will manage the Portland office, is a utilities analyst and Wilson has been associated with Stevens. The firm will specialize in power supply problems and transmission lines, Stevens said.

► **Mobile displays** of G-E's distribution transformer products are now on a nation-wide tour to be completed about Aug. 1. The tour is designed to acquaint electric utilities with total owning costs of distribution transformers and product innovations.

► **Gustav E. Engelbrekt** has been named Northwest representative for Utica Drop Forge & Tool Division. His headquarters will be in Seattle.

**NEW HOME: The machinery and electrical department of American Factors Ltd. will occupy new quarters in the company's Amfac Park facility in Honolulu, according to Vice President Willard L. Doering, general manager of the wholesale division. The new building will include a ground floor of 33,000 sq ft with 18-ft ceiling, an elevated parking area to accommodate 100 automobiles and a third-floor office structure of approximately 17,000 sq ft. Machinery and electrical already has warehouse space and an air conditioned display room at Amfac Park, with offices being located at present at Fort and Queen Streets downtown. Construction of the $750,000 building will begin in September**

**Kearney Hot Line Tool Demonstrators offer line crews new ideas and methods to...**

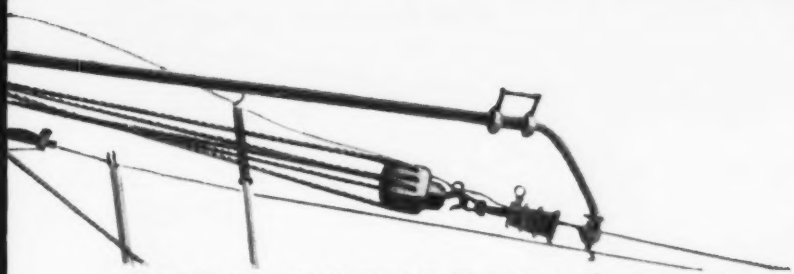
# SAVE MAN-HOURS . . . PREVENT ACCIDENTS . . .

"IF YOU CAN INSTALL IT COLD... YOU CAN INSTALL IT HOT!"

Kearney Hot Line Tool Demonstrators prove the truth of the above statement day after day . . . by demonstration on actual live-line maintenance jobs. Through such demonstrations line crews learn proper safety procedures and time-saving, cost-cutting methods to make their job of maintaining energized lines easier and safer.

"On the job" demonstrations help solve spot problems and introduce new methods to line crews which can be used to advantage over and over again . . . to reduce costs, insure reliable operation and improve safety standards.

"We teach something, we learn something . . . every-time out"... says Clete Brewer, Chief of Kearney Demonstrators. This sums up the attitude of Kearney men in the field, explains why they are well-regarded by line crews everywhere.



# . . . STOP NEEDLESS OUTAGES

Even experienced line crews can benefit from the specialized knowledge of Kearney Hot Line Tool Demonstrators. Their background and experience in all phases of rigging, hot line maintenance, and compression connector installation techniques fully qualifies them to assist in training line crews in improved methods to shorten installation time . . . prevent costly de-energizing of lines . . . and improve safety conditions.

**Kearney Hot Line Tool Demonstrators . . . are your only single source of complete information on compression connector installation and hot-line maintenance techniques!**

Kearney . . . and only Kearney . . . manufactures both a complete line of hot stick tools **and** a complete line of compression connectors, tools and dies. The completeness of these two lines is part of Kearney's planned program to provide power companies with a fully integrated selection of equipment to safely accomplish any phase of hot line work . . . without interruption of circuit continuity or service to customers.

If you would like to arrange for Kearney Demonstrator Service consult your Kearney Sales Representative. Adequate advance notice is necessary, of course, to permit proper planning and scheduling.

KEARNEY

## JAMES R. KEARNEY CORPORATION

4224-42 Clayton Avenue • St. Louis 10, Missouri

PLANTS AT: ST. LOUIS • MELROSE PARK, ILLINOIS • FAYETTEVILLE, ARKANSAS
GUELPH, ONTARIO, CANADA • ST. THERESE, QUEBEC, CANADA

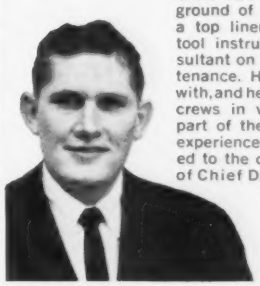
513

Hot stick schools conducted by Kearney Hot Line Tool Demonstrators keep linemen up to date on new installation and maintenance methods . . . new tools and equipment . . . new rigging techniques . . . and new ideas being used to advantage by line crews in other areas.

## Chief Demonstrator Clete Brewer and his staff...

. . . cover the country. Kearney Demonstrators are available for help in training line crews or for consultation relating to specific job problems anywhere in the U. S. Each man is a well-qualified veteran with many years of past experience as a top lineman.

*Chief Demonstrator Clete Brewer*



Clete has a wide background of experience as a top lineman, hot line tool instructor and consultant on hot line maintenance. He has worked with, and helped train, line crews in virtually every part of the country. His experience is ideally suited to the demanding job of Chief Demonstrator.

CARL JONES

DICK TASKER

JIM MONARSKI

BOB DALE

BERT ROSE

"WHITEY" KOHLER

## STOP TRANSFORMER FREEZE-UPS

Eliminate costly transformer corrosion and freeze-ups with a Horkey-Moore Porta De-Con unit. This compact, portable equipment decontaminates liquid petroleum products by removing particulate contaminants, water and air. Returns oil actually cleaner than new. Removes all free water plus all dissolved water down to 20 parts per million (80°F.), therefore requires far less frequent servicing. Increases dielectric strength beyond 35KV. Simple, automatic operation. Saves time, saves labor, saves equipment, saves cost of transporting and replacing oil. Reasonably priced. Send today for brochure.

**HORKEY-MOORE ASSOCIATES** HF **Division of Houston Fearless Corp.**

*24660 Crenshaw Boulevard, Torrance, California / SPruce 5-1211*

## Keeping line clearance costs DOWN goodwill UP

Proven power equipment and Davey trained rope climbers . . . that's what makes Davey Surgical Line Clearance so economical. Utilities can rely on the dependable, efficient, and *adaptable* Davey crew. It will pay you to talk over your tree maintenance problems with the West's leading line clearing specialists—Call Davey.

**DAVEY**
**TREE SURGERY CO., LTD.**
**OF CALIFORNIA**

SAN FRANCISCO • Russ Building
LOS ANGELES • Story Building

► As part of a General Electric plan to bolster its communications with the West, **Robert N. Slinger** has been appointed to a new staff level post in the company's Electric Utility Engineering Operation. He will be systems engineer for Western areas. A native of Portland, Ore., he joined the company's test course in 1926 after his graduation from Oregon State College. He was assigned to the alternating current design department in 1928 and in 1941 he was transferred to St. Louis as an application engineer. He was named manager of engineering for the Mid-States District in 1953.

**Slinger**

► **William L. Trudgian** has been appointed Pacific Coast regional construction and distribution manager to direct a new operation. According to Walter J. Maytham, Pacific Coast vice president of Westinghouse, the new marketing concept was established in recognition of the growing importance of the construction industry and is designed to improve Westinghouse service to architects, consulting engineers, contractors and building owners, managers and developers. A native of Denver and an engineering graduate of the University of Colorado, he joined Westinghouse in 1936 on the graduate student program; since then he has been on the agency and construction staff in Seattle and Salt Lake City and more recently in San Francisco as Pacific Coast regional manager.

► **Robert Matzinger** has been made manager of the **Matzinger-Johnson** Co. in Los Angeles, manufacturers' representative for electrical utility equipment. He has been with the company for more than two years as a field sales engineer. The utility accounts that he has been handling will now be serviced by **Paul Winkler**, who joined the company recently.

► **Howard A. Andersen,** president and co-founder of the Portland construction firm of Andersen-Westfall Inc., has purchased the stock of F. G. Westfall. The firm is engaged in three multimillion-dollar contracts in Portland, including the 23-story Hilton Hotel, the Standard Insurance Building and a new post office building.

## Price Changes

Effective May 15, a change in the price structure of its pole line hardware was announced by **A. B. Chance** Co. According to L. C. Hansen, vice president and general manager, the change was brought about through re-evaluation of prices in view of the consolidation of the manufacturing facilities at the company's Centralia plant.

The changes include: (1) Product line simplification that will remove from the published price sheet seldom used products. (2) A re-evaluation of the Zone 1 prices based on real costs. This involves on the average a price reduction of approximately 5% to 7% in the present Zone 1 prices. (3) Elimination of Zones 2 and 3 so that all pricing east of the Rocky Mountains will be on the Zone 1 base. This amounts to a substantial reduction in present Zones 2 and 3 prices. (4). There will be no change in the price structure on Western Zones 4 and 5 at this time because they are under study.

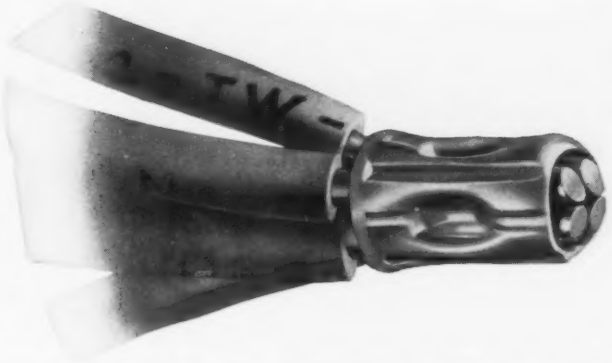
The company also announced a price reduction on the greater part of its anchor line. Expanding anchors will be reduced approximately 10% and No-Wrench anchors approximately 15%.

**Allis-Chalmers** has changed its published prices for small power transformers, 501 to 10,000 kva, and for network transformers. The new prices for power transformers are at a higher level than recent market quotations but are lower than the old published prices depending upon kva and voltage rating.

Increases of published prices on 100- and 50-kvar capacitors have been put into effect by **General Electric's** capacitor department. Fifty-kvar units were increased from $97.33 to $110 and 100-kvar units from $194.66 to $209. Switched pole top equipments were adjusted to reflect the changes in unit prices. Stack-rack equipments were increased from $2.24 to $2.49 per kvar for equipments with 50-kvar units and from $2.24 to $2.38 per kvar for equipments with 100-kvar units. The department also changed its price protection period from 12 months from date of order to 90 days from the date of a price increase.

**Allis-Chalmers** put into effect new prices for all outdoor power circuit breakers on April 22. The new prices are substantially lower than those previously listed and reflect present market levels, according to John L. Black of that company.


**BUCHANAN KEEPS MAKING WIRE SPLICING BETTER • • •**

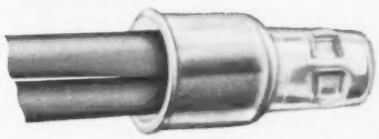


**SPLICE WITHOUT WIRE TWISTING.** Buchanan's new 2008S Splice Caps splice 2 #18's thru 4 #12's better and faster than ever. They won't pull off, twist off or shake off even untwisted wires. They're crimped with Buchanan's C24 pres-SURE-tool and insulated with 2007 Snap-On Nylon Insulators.

Exclusive fluted design strengthens the cap and confines conductors in a tight area for intimate wire-to-wire contact.

2008S Splice Caps are UL and CSA listed as "pressure-type wire connectors" and "fixture-type splicing connectors" for 2 #18's thru 4 #12's. Insulators are listed for 600 v. on building wire and 1000 v. in fixtures, in applications to 105°C. (221°F.). Also UL listed for 1000 v. in electric signs.

**• • • AND BETTER**



**PUT THE SQUEEZE ON PRE-INSULATED SPLICING COSTS**—with Buchanan's completely new combination of 2002 Wide-Range Pre-Insulated Splice Caps and pneumatic or hand operated Ratchet-Controlled tri-SURE-tools.

One size cap covers a wide range of wire sizes. The 2002's tough see-thru nylon insulator has extra long skirt for maximum grounding and short circuit protection.

One tool installs these caps. There is no wire twisting. Both hand and pneumatic tools are ratchet-controlled to prevent under-crimping and over-crimping. Exclusive three-indent rolling action minimizes puncturing, splitting or thinning-out insulation.

Listed as "pressure-type splicing connectors" and "fixture-type splicing connectors" for use on 2 thru 6 #18 str., 3 thru 5 #18 sol., 2 or 3 #16 str. or sol., 2 #14 str. or sol., 1 #12 with 1 #14 str. and numerous other combinations. Also listed for 600 v. max. on building wire; 1000 v. max. in fixtures to 105°C. max. Also UL listed for 1000 v. max. in electric signs.

**Write for Bulletin W-6**

BUCHANAN a subsidiary of ESNA

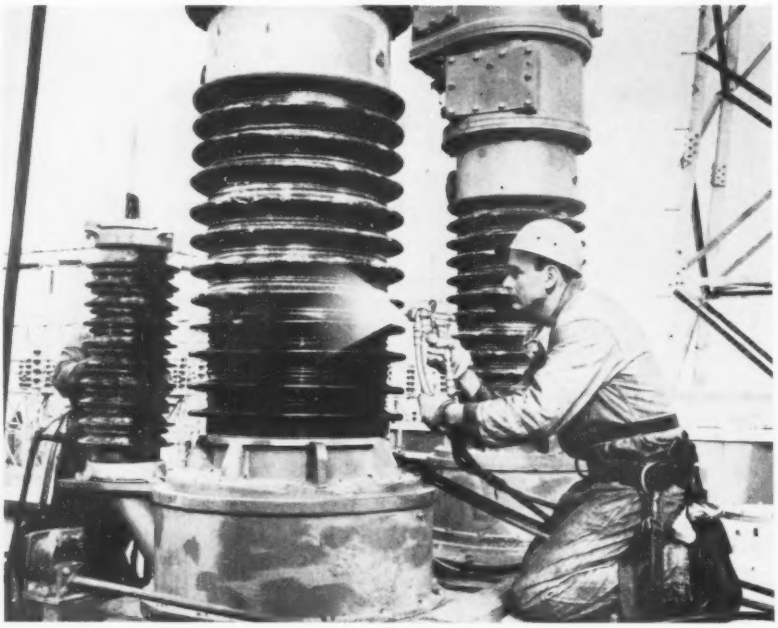
**BUCHANAN ELECTRICAL PRODUCTS CORPORATION**
**HILLSIDE, NEW JERSEY**
In Canada: ESNA CANADA LIMITED, Toronto 16

Booth 609—Plant Maintenance & Engineering Show—Los Angeles

LOS ANGELES: Frank Rozema, 412 Seaton St., MA 9-3855; DENVER: Fred A. Pease Co., 4921 E. 38th Ave., DU 8-4643
PORTLAND: Keeler White-Portland, 523 N.W. Everett, CA 7-0593; SEATTLE: TAL Agencies, 1041 Sixth Ave., S., MA 3-2367

# PRODUCT NEWS

## New designs and applications



### Insulator Grease

*General Electric Co.*

A new insulating silicone-base grease, called Insulgrease, designed to alleviate effects of atmospheric contamination deposits on insulators, has been developed for use as a spray by General Electric's Insulator Department, Baltimore, Md.

To prevent electrolyte formation under fog or rain conditions, Insulgrease silicone coating engulfs and encapsulates contaminant particles. Use of Insulgrease provides a nonwetting surface coating on which moisture forms individual globules which are readily shed. These actions combine to minimize leakage currents over insulator surfaces.

**Circle No. 1**

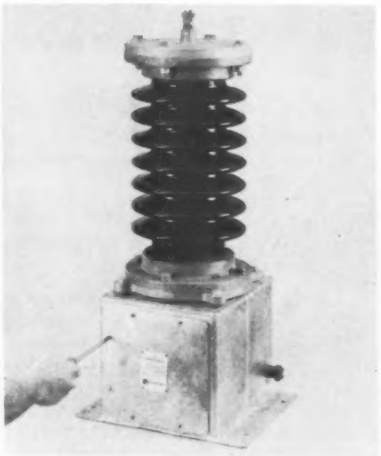
### Capacitor Control

*Allis-Chalmers Mfg. Co.*

Development of a new voltage-sensitive, current-bias control for capacitor switching has been announced by this company's Industrial Group.

The new device, usually used on systems where generator voltages are heightened with increase in load, can be completely installed in less than half the time it takes to set up existing controls, with corresponding cost reduction. The new device is readily adjusted in the field to meet operating conditions.

**Circle No. 2**



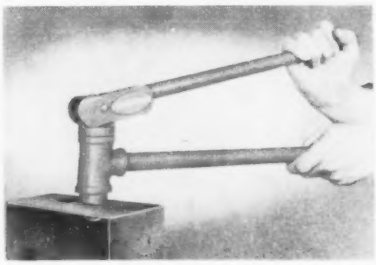
### Potential Device

*S&C Electric Co.*

A new potential device for monitoring voltages in the 23- to 161-kv ranges has been introduced by S&C Electric Co. to replace conventional potential transformers. The potential device costs 65% less than comparable potential transformers.

The new device is a high-voltage, oil-immersed resistor providing up to 3.5 milliamp as a direct function of line-to-ground voltage. With suitable accessories, the potential device can: (1) sense voltage for automatic switching; (2) detect grounds; (3) indicate voltages through indicating lamps or meter instruments; (4) supply potential for certain relays; and (5) charge batteries.

**Circle No. 3**

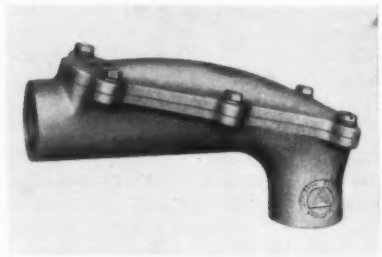


### Knockout Nibbler

*Hykon Mfg. Co.*

This company has announced a knockout nibbler which is a tool-steel cutter with ample leverage to cut away metal as heavy as 10-gage steel from outlet, junction or ceiling boxes. The device is said to be a great improvement over the old method of sawing, filing, drilling or reaming.

**Circle No. 4**



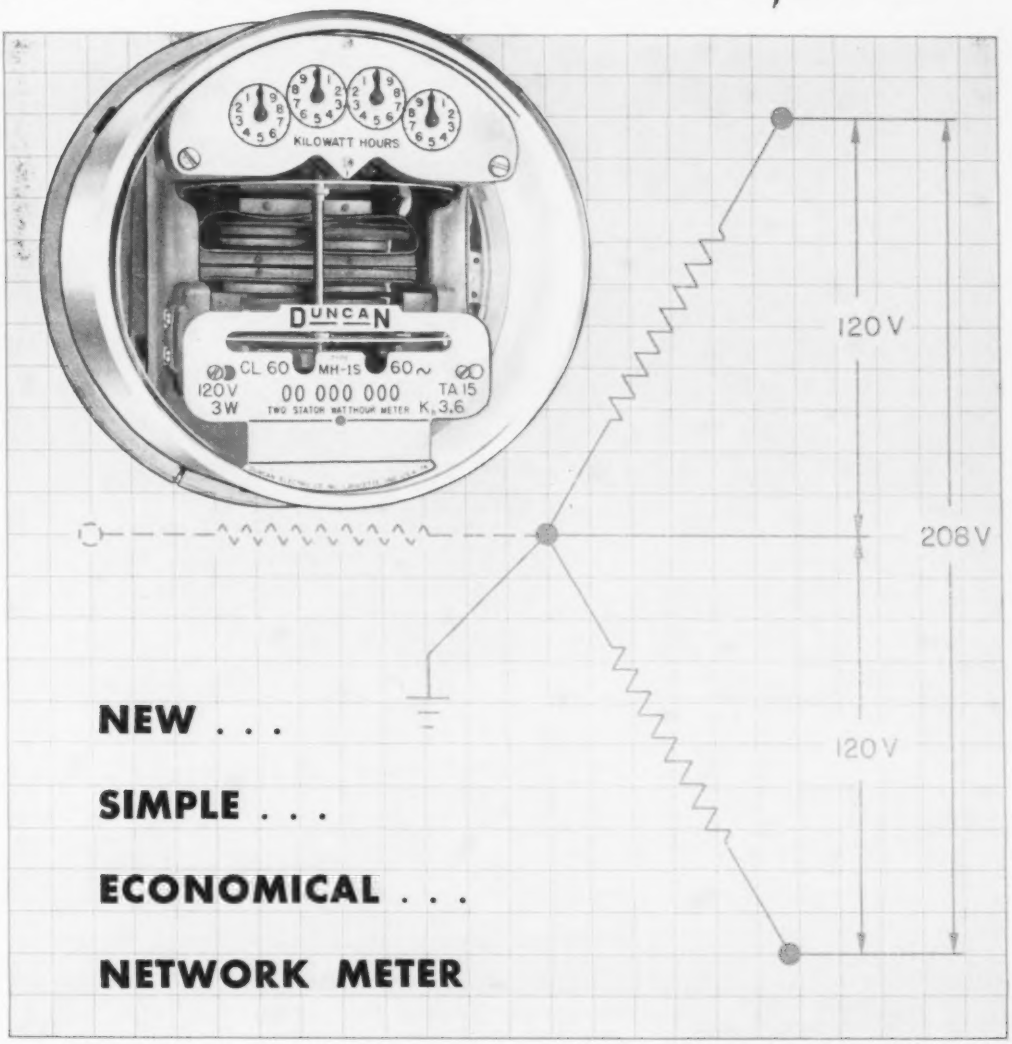
### Pulling Elbow

*Appleton Electric Co.*

The problems of pulling heavy cables are said to be minimized by Appleton Electric Co.'s new pulling elbows. The 2½- to 4-in. sizes have exclusive roller features that provide the greatest possible ease and accessibility during the pulling operation.

**Circle No. 5**

# *Another* **DUNCAN** *Development*




*The MH-1S—the newest network meter in the industry!* Duncan's new meter is a simplified two stator watthour meter with customary adjustments eliminated, reduced weight, increased stability, lower price, and the same high quality performance.

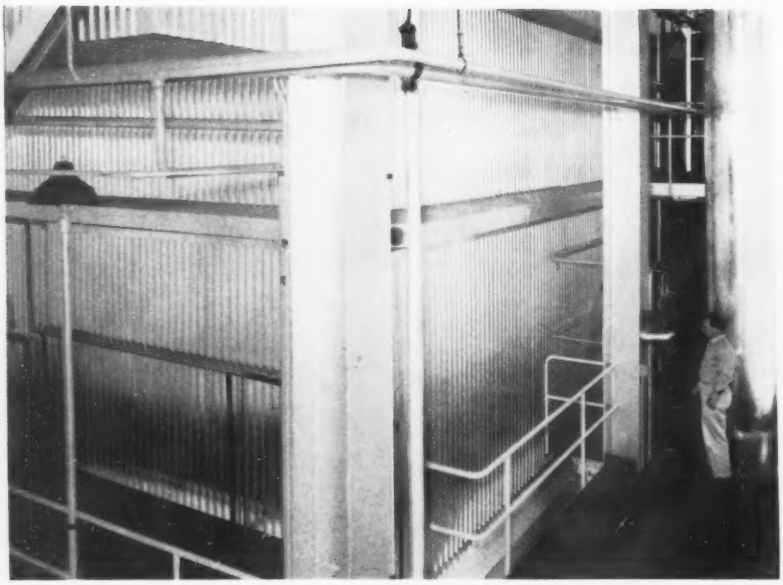
The MH-1S is initially calibrated at the factory by adjusting the strength of the damping magnets. Fine adjustments, as required, are made with torque balance adjusting screws. Duncan has simplified construction and assembly of the electromagnets by keying the potential and current coils together in a die-casting operation and assembling them directly to the frame.

Use of Alnico high-energy surge-resistant damping magnets in the MH-1S assures calibration stability for the life of the meter. Alnico magnets were pioneered by Duncan over 25 years ago, and with simplified assembly and adjustments, make the MH-1S a "User Approved" meter.

"Thinking Ahead . . Moving Ahead . . . to stay Ahead of Demand"

WATTHOUR METERS • MOUNTING DEVICES • DEMAND METERS

*For phone number of closest representative see advertising index in back of book.*



## Boiler Lagging

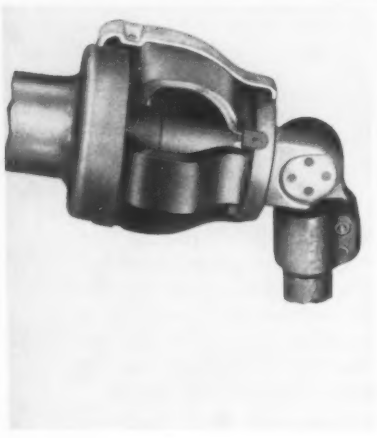
*Aluminum Co. of America*

Dressed in aluminum coats are Units 1 and 2, Reeves Station, Public Service Co. of New Mexico, Albuquerque.

The coat is aluminum boiler lagging. Lagging provides the outer covering for insulation protecting boilers and other equipment at steam generating stations. Photo shows lagging on Unit 2.

Installed in 1958 and 1960 by Stearns-Roger Mfg. Co., Denver, engineer and constructor, the lagging at Reeves is Aluminum Co. of America's ribbed industrial siding sheet. Stearns-Roger will make a third installation of Alcoa lagging on Reeves Unit 3, to be completed in mid-1962.

**Circle No. 6**



## Bus Fittings

*Southern States Equipment Corp.*

Southern States has developed a line of weld-type corona-suppressing electrical bus fittings. The expansion stud connector, shown above, is designed for corona-free operation up to 345 kv. Other arrangements are available for application at 460 kv. Integral-shield design eliminates the need for external grading rings. Expansion unit is welded construction throughout. Recessed bolts mount unit at desired angle to stud clamp.

**Circle No. 7**

## Silicone Rubber Tape

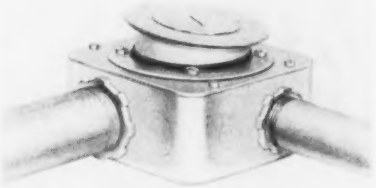
*Minnesota Mining & Mfg. Co.*

This company announces a pressure-sensitive, unsupported silicone rubber tape that combines the physical and electrical properties of silicones with ease of application and is helping to solve high voltage splice and termination problems for several industrial contractors and maintenance crews.

Terminations in the primary substation at a salt mine, reinsulation of silicone rubber cable at a steel mill and protection of primary bushings and potheads at a rayon mill are several of the situations where the tape has been used successfully.

Called Scotch brand electrical tape No. 70, it combines cured silicone rubber with a pressure-sensitive silicone adhesive. The tape is designed to be compatible with silicone cable insulation and can be used as a protective cover on standard terminations and potheads.

**Circle No. 8**



## Floor Box

*Thomas & Betts Co.*

A new floor box (concrete type) recently introduced by this company is said to solve a variety of installation problems. The boxes have 13 knockouts, including eight in-line, in a variety of sizes from ½ to 1¼ in. A minimum box height of 2⅛ in. is available which makes it suitable for shallow floors.

**Circle No. 9**

## Wireholder

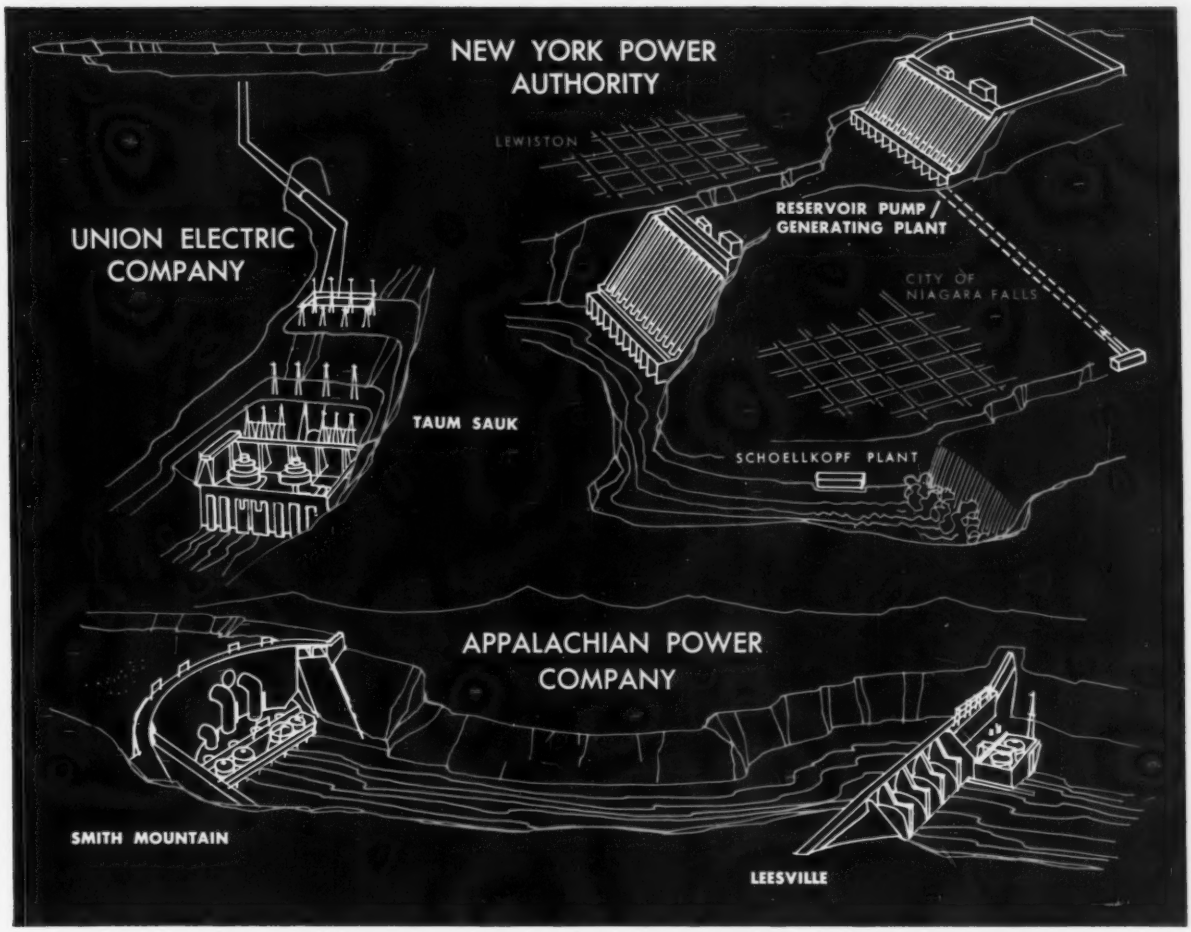
*Porcelain Products Co.*

A new oversize pipe mounting wireholder for use on 3-in. and 4-in. pipe has been announced by Porcelain Products. This new wireholder mounts on larger size pipe than any previous wireholder in the company's line. This wireholder is expected to be used by utilities, industrial maintenance crews, as well as electrical contractors.

**Circle No. 10**

**For More Product Information Fill in Coupon on Page 117**

ALLIS-CHALMERS




Just what you'd expect from the pumped-storage pioneer:

# first in all three

*Pumped-storage power projects now under construction in this country all rely on Allis-Chalmers reversible pump-turbines. In fact, A-C is the only builder of complete reversible pump-turbine equipment!*

**First in boosting existing hydro at Niagara Reservoir pump/generating plant!** This pumped-storage project will capitalize on the hydro-electric power potential of Niagara River without adversely affecting the scenic beauty of the Falls. Largest project of its kind, this installation will include 12 reversible pump-turbines with motor-generators . . . all designed and fabricated by Allis-Chalmers. As a turbine, each unit is rated 28,000 hp under 75-ft net head; as a pump, 3,400 cfs at 85-ft total head.

**First in pure regeneration — at Taum Sauk!** . . . also to have the largest-capacity hydro units ever built. Allis-Chalmers will supply two 175,000 kw reversible pump-turbines, each with a capability exceeding 300,000 hp under 800-ft head. (Pure regeneration installations need only a water supply to replace evaporative losses, so a creek is ample. Even a hill is unnecessary: the pool can be underground, in an abandoned mine shaft, for example.)

**First in run-of-river — at Smith Mountain!** This new project involves reservoirs at two successive levels, the lower dam forming a tailrace pool at the upper dam for two A-C reversible pump-turbines, each rated 87,000 hp at 180-ft head. Conventional hydro-generating units will also be installed — two higher-head units at the upper dam and two lower-head units at the lower dam.

*For complete information on pumped-storage, hydro-generating equipment or other components for water control, contact your nearby A-C office. Or write to* **Allis-Chalmers,** *Hydraulic Division, York, Pa.* A-1385

*For phone number of closest representative see advertising index in back of book.*

## Vibration Damper

*Preformed Line Products Co.*

This company has recently announced a spiral vibration damper. The new damper, which controls vibrations even at high frequencies, is recommended on spans where it is necessary to correct existing undamped lines or on new construction in areas where vibration is known to be a threat to suspension points.

**Circle No. 11**

## Aluminum Line Traps

*Westinghouse Electric Corp.*

In ratings of 400, 800, 1,200 and 1,600 amp rms continuous with short time ratings from 15,000 to 44,000 rms amp, aluminum line traps are now available from Westinghouse. The company says these units weigh 33% less and have correspondingly improved strength-to-weight ratios.

**Circle No. 12**

## Hot Line Clamp

*J. A. Weaver Co.*

A new aluminum hot line clamp has been developed by this company which is said to be tightened by the lever and fulcrum principle rather than the usual bolt-and-slider method. This design is said to permit greater pressure on the conductor, creating a tighter, longer-lasting connection.

**Circle No. 13**

## Directional Tree Faller

*Idaho Northwoods Co.*

A new piece of equipment just placed on the market offers a radical innovation in the way of a low-cost method for removal of problem trees. It permits safe control of the direction of fall of heavily leaning trees that threaten buildings, power and telephone lines or other improvements.

Called Trott's directional tree faller, the device also is a new and useful tool in forest fire control, for recreational improvements, park maintenance, right-of-way clearing and other situations where time or damage could be saved by accurately controlling direction of fall of problem trees.

Leaning utility poles can be straightened quickly and easily with an accessory to the tree faller.

**Circle No. 14**

## Low-Voltage Bushing

*Ohio Brass Co.*

New oil-paper bushings have been added to O-B's line of low-voltage transformer bushings. From 69-kv down to 15-kv service, these new Class GK bushings will complement the Breaker-Tran line by covering the common dimensional requirements for transformer bushings included in Table 3, ASA standard C76.1a-1958.

**Circle No. 15**

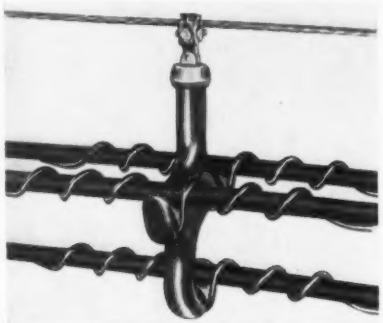
**For More Product Information Fill in Coupon on Page 117**

## Lockout

*Industrial Products Co.*

A new lightweight multiple lockout for electric switch and fuse boxes has been introduced by Industrial Products Co. of Philadelphia. Slots are provided for six padlocks so that each workman may have his own padlock and key assuring that the box cannot be reactivated until all men working on the line have completed their work. The two ends of the lockout are said to provide for virtually any type of electrical equipment, even the latest large handled front switching units as illustrated.

**Circle No. 16**



## Cable Spacer

*Fargo Mfg. Co.*

A new one-piece porcelain spreader for spacer type aerial construction is announced by Fargo. The one-piece body is high quality wet process glazed porcelain. The universal or swivel type mechanical connection at the neutral provides permanent positioning of the spacer. Conductors are firmly and easily attached with rigid poly-vinyl chloride factory formed tie rods. The spacer is designed for complete hot stick installations at either 5 kv or 15 kv.

**Circle No. 17**

# ALLIS-CHALMERS

*Extended Foil Capacitors*

A-1473

4800-kvar Allis-Chalmers capacitor enclosure with provision for future expansion to 6000 kvar.

## Install an Allis-Chalmers CAPACITOR ENCLOSURE where

# appearance and dependability count

### Allis-Chalmers enclosures are complete:

- Shipped assembled with 50 kvar capacitors, fuses, controls, current and potential transformers, switch and incoming line termination.
- Capacitors individually fused.
- Fans in each modular section thermostatically controlled.
- Mechanical interlocks insure a closed grounding and shorting switch before cubicle doors can be opened.
- Dead-front control compartment isolates the circuit breaker and grounding switch.
- Vacuum switch or circuit breakers can be supplied.
- Roof entrance bushings or pothead for underground cable is available.
- Viewing window in rear of entrance cubicle for visual check of grounding switch position.
- Outdoor metal enclosure with three coats of paint.

*Specify* **Allis-Chalmers** *extended foil capacitors! Call, wire or write your nearby A-C office.*

Capacitor enclosed equipment available for 2400 through 13,800-volt, three-phase service, up to 6000 kvar. Allis-Chalmers also offers outdoor stack-racks and pole-mounted racks as well as current and voltage sensitive controls.

**Allis-Chalmers extended foil design capacitors** withstand higher inrush currents. Current densities are lower at point of contact between the packs and the contact plates than is possible with conventional tab-type capacitor construction.

*For phone number of closest representative see advertising index in back of book.*

# LEVITON QUALITY TALKS

**New Shallow Residential Type Grounding Receptacles Listed by Underwriter's Laboratories, Inc.**

**Complies with N.E.C. Code**

These low-cost, high-quality, 3-wire U-Ground Duplex Receptacles are designed to fit shallow mounting boxes and the "handy" boxes found everywhere in thin wall construction trailers, partitions and prefab homes. Two types of receptacles are available: No. 1215 for conventional-loop side wiring and No. 1297 for both side or "straight-in" back wiring.

You'll save on-the-job time and trouble with these inexpensive devices: a new removable fin-feature makes it easy to convert them to 2-circuit wiring. What's more, the units have staked 8-32 binding head screws and green hex grounding screw. One binding screw at each contact is backed out to simplify the job.

These devices are one-piece construction in brown phenolic or ivory thermosetting plastic. They take up to #12 conductors and accommodate two-wire standard or polarized caps as well as three-wire U-Ground types. Double-wipe bronze contacts give you better grip and longer life and captive mounting screws permit fast, easy installation.

**Catalog No. 1215**
**Rating: 15A.-125V.**

*LEVITON QUALITY TALKS BUSINESS*

**LEVITON®**

**LEVITON MANUFACTURING CO., INC.,**
**BROOKLYN 22, N.Y.**
**Chicago — Los Angeles — Montreal, Canada**

Contact American Insulated Wire Corp., Pawtucket, Rhode Island, a Leviton subsidiary, for a complete line of insulated wire and cable products.

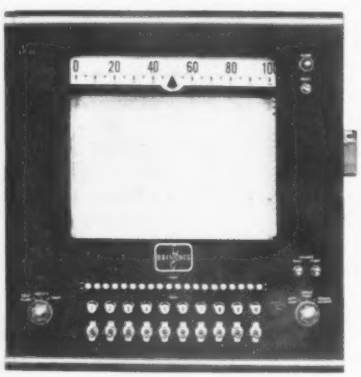
## Lightweight Transformers

*Kuhlman Electric Co.*

Utilizing a new lightweight design that allows a large boost in kva that can be pole mounted, Kuhlman Electric has announced three new lightweight transformers in 500-, 333- and 250-kva ratings.

The weight of the new 333 kva is said to be cut 50% and its height shrunk to 46½ in. with an accompanying reduction in losses of 29%.

**Circle No. 18**




## Alarm Scanner

*Bristol Co.*

The Bristol Co. has developed a new 200-point transistorized alarm scanner capable of scanning up to 200 measured variables at the rate of one point per second. On discovery of any off-normal situation, the instrument activates a recorder (which records the alarm condition measurement and reports its exact location), actuates a red alarm lamp, and energizes any desired external alarm system. Upon completion of these functions, the instrument returns to normal scanning, leaving the alarm lamp on until a reset button is depressed.

**Circle No. 19**

## Var Control

*Westinghouse Electric Corp.*

An improved var control for switching capacitors is now available from this company.

Two styles are available: one for wye systems; one for delta. Both are adjustable from 250 vars leading to 500 vars lagging. The two contact settings (close and trip) are independently adjustable through the entire range provided the band spread between them is greater than the change produced by switching the capacitors.

**Circle No. 20**

## Emergency Lighting Units

*Electric Storage Battery Co.*

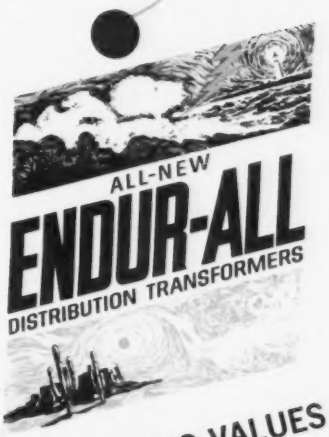
A new automatic emergency lighting unit capable of illuminating 10,000 to 25,000 sq ft for three to eight hours or more has been introduced by this company's Exide Division. Largest model in a line of battery-powered equipment, the 100-amp-hour model operates automatically and instantaneously when normal power fails and automatically recharges itself in the shortest possible time after power is restored, making it ready for the next emergency.

**Circle No. 21**

**For More Product Information Fill in Coupon on Page 117**

# ALLIS-CHALMERS

A-1462




## *New* ENDURING VALUES DELIVER MORE FOR YOUR TRANSFORMER DOLLAR!

**New!** More overload capabilities with greater cooling duct area, lower temperature gradient.

**New!** Even more overload capabilities with high-temperature insulated wire.

**New!** Still more overload capabilities with high-temperature oil.

**New!** As much as 25% lower impedance. Less voltage drop under higher overloads — permits full utilization of the greater overload capacity.

**New!** High short-circuit strength with automatic compression and locking of end-frame assembly.

**New!** 32 potential trouble-makers eliminated in core-and-coil end-frame assembly. No nuts, bolts, washers to lose, no welds to break.

**New!** Easier to handle and hang — units are 10% smaller and lighter.

**New!** High-gloss appearance and longer retention life with 3 baked-on paint coats.

**New!** Improved seal — nonaging, nonsetting gasketing.

**New!** Series-multiple switch — for lower changeover cost when making distribution voltage conversion.

**New!** Uprated *Thermalite* overload indicator — extra safety factor. Spots dangerous overloads from the ground.

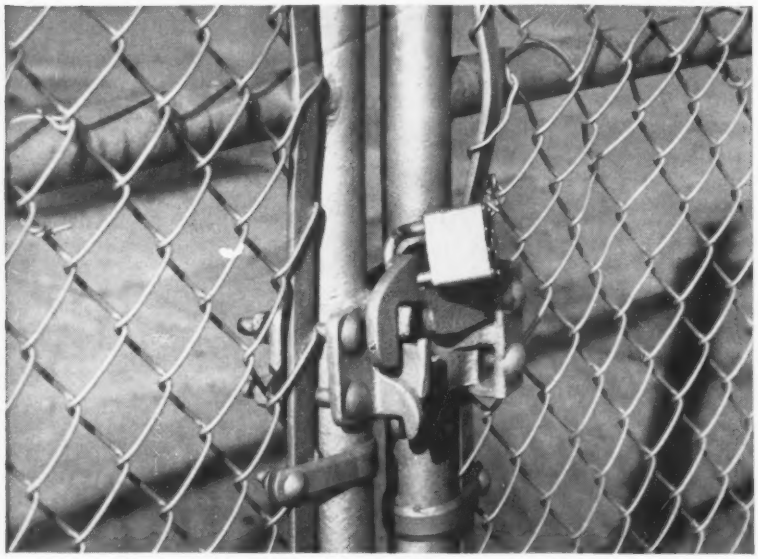
*for more details*

**CALL, WRITE OR WIRE . . .**
***Allis-Chalmers,***
***Power Equipment Division,***
***Milwaukee 1, Wisconsin***

ENDUR-ALL and *Thermalite* are Allis-Chalmers trademarks.


*For phone number of closest representative see advertising index in back of book.*

# HOW TO PRESERVE YOUR FENCES



## Lock Out Corrosion

**Step No. 1**
Protect new galvanized fences as soon as they are erected. Minimize rust stains; preserve newness. It's simple and inexpensive: Use GALVANOX, cold-applied galvanizing, to touch up spots where original galvanizing has been damaged during erection.

GALVANOX is delivered in the form of a ready-mixed paint and applied with an ordinary paint brush — dries in 20 minutes and becomes thoroughly hard overnight. Being 95% pure metallic zinc and electrically conductive, the zinc acts as a sacrificial anode and the steel as the cathode, thereby establishing a galvanic cell very similar to the hot-dip galvanizing itself.

**Step No. 2**
When the fence has weathered to the point where the galvanizing has worn thin and shows rust staining, then apply a single coat of SUBALOX #508 GUN METAL. It matches the appearance of the weathered galvanizing and maintains a uniform appearance for both old and new sections. Other colors are also available, if color change is desired.

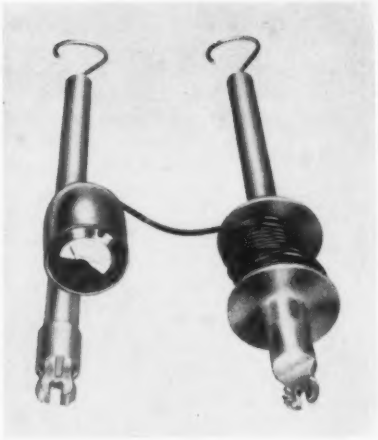
SUBALOX contains the unique, chemically-active pigment, suboxide of lead. It is highly rust-inhibitive, hard and yet truly flexible. It clings to the small, round surfaces of wire mesh, penetrates where the wire overlaps, and provides protection for an average of 5 to 8 years per single coat. No other surface pretreatment, primers or finishers are required. And SUBALOX PAINT works so easily it can be used by brush, spray, roller or even floor broom to provide good jobs. Planned fence maintenance keeps good appearance, preserves investment, reduces costs. Further details sent gladly on request.

# SUBOX PAINTS

Subox Inc.

Trade Mark

Main Office & Plant • 18 Fairmount Park • Hackensack, N. J.
SALES ENGINEERS IN MOST MAJOR CITIES
Affiliated Plants: Canada, Mexico, England, Belgium, Switzerland, Austria, Australia, New Zealand.

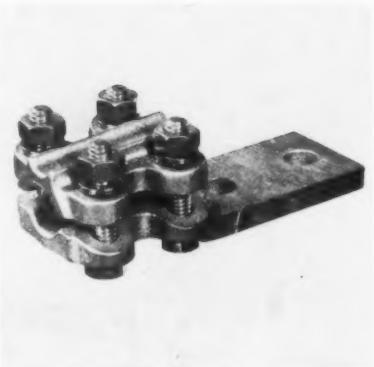
### Phase Tester

*A. B. Chance Co.*

A new device, called a phasing tester, is being manufactured by this company. The tester is used to determine the correct phase relationship before joining circuits.

The basic phase tester is used on voltages up to 15 kv and has extension resistors available so that the unit can be used on voltages up to 75 kv.

**Circle No. 22**



### Terminal Lug

*Penn-Union Electric Corp.*

Penn-Union announces the addition of a line of wide-range bronze terminal lugs. This line is said to feature a wide-range reversible cap, making five sizes cover the application of any cable size from No. 8 solid through 2,000,000 mcm stranded copper conductor.

**Circle No. 23**

**For More Product Information Fill in Coupon on Page 117**

# MANUFACTURERS' LITERATURE

**For fast action in securing the manufacturers' literature listed below and more information on new products described in the preceding pages, use the coupon below. Circle the items wanted and mail to Electrical West**

STRINGING EQUIPMENT — A 36-page catalog has been issued by Sherman & Reilly. New items listed include spacer-type aerial cable, bundle conductor stringing, lightweight all-aluminum, and helicopter stringing blocks. Dimensional and working load information is given. For a copy *circle No. 24.*

ABC'S OF REGULATORS—An elementary treatise on single-phase, 32-step distribution regulators has been prepared by Line Material Industries. Included are basic diagrams, rating tables and calculation examples. For a copy of bulletin 61052, *circle No. 25.*

POTENTIAL DEVICE—S&C is offering a bulletin on construction and function of a new potential device for monitoring voltages in the 23- to 161-kv ranges. For bulletin 745 *circle No. 26.*

SWITCHGEAR — New design features of 600-v switchgear with K-Line circuit breakers are described in bulletin 3200-1A from I-T-E. The 20-page publication gives comprehensive information on low-voltage power circuit breakers and switchboards in ratings from 225 to 4,000 amp. For a copy *circle No. 27.*

BALLASTS—Advance Transformer Co. is offering a four-page folder describing its improved Solid-Fil development. The entire line is available with this or the conventional fill. Also issued recently by the company is a directory of names and addresses of authorized distributors. For copies *circle No. 28.*

TELEMETER SYSTEM — G-E's bulletin GEZ-3312 tells operating features of digital telemetering systems with descriptive schematics, system specifications and available accessories. This equipment is for high accuracy data transmission of kwh readings from remote locations to central load dispatch offices. *Circle No. 29.*

SERVICE ENTRANCE EQUIPMENT — Operating and safety requirements of service entrance equipment are detailed in a bulletin published by the Pringle Electrical Mfg. Co. For bulletin 601, Facts You Should Know About Service Entrance Equipment, *circle No. 30.*

IONS—A booklet telling how to build negative-ion generators and how to measure their output is available from Westinghouse Electric Corp. For booklet CE 860 *circle No. 31.*

COMPUTER POWER SUPPLY — G-E's bulletin GEA-7303 tells how the company's new brushless design 400-cycle motor-alternator set isolates 60-cycle input power from output to prevent input line transients from affecting computer performance. *Circle No. 32.*

CONTROLLER—The SpaceMaker, a two-high drawout motor controller, is described in a new bulletin from Allis-Chalmers. This unit is claimed to be the first starter in the 2,000- to 5,000-v range to employ a two-high motor control center design. For bulletin 14B9739 *circle No. 33.*

CABLE—Data on the various kinds of silicone-insulated cable made by the Boston Insulated Wire & Cable Co. are given in a four-page bulletin entitled Single and Multiconductor Cable With Silicone Rubber. *Circle No. 34.*

**ELECTRICAL WEST** *Not good*
**255 California St., San Francisco 11, Calif.** *after August 1*

**Please send me, without obligation, the new product information or catalogs.**

**If described in Product News, circle item number**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | | |

**If described in advertising, fill in page number**

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NAME ..... TITLE .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Crapo
GALVANIZED
STEEL STRAND

When in need of guy or messenger strand during an emergency, be sure to contact the nearest distributor of **Crapo** Galvanized Strand! Substantial stocks are maintained at strategic distributing points throughout the country ready for immediate delivery. Back of these stocks are our own extensive mill stocks of finished strand, and strand in process. If your jobber does not have all of your requirements, he knows he can depend upon us for immediate shipment of popular sizes and grades by air, truck or rail.

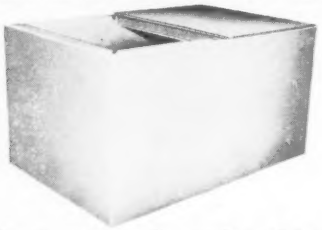
You, in turn, can rely upon **Crapo** Galvanized Steel Strand, at all times, to give you the utmost in performance at reasonable cost.

**Crapo** Galvanized Steel Strand is manufactured in all standard sizes and grades and in three weights of coating: Class A, B and C.

Phone the distributor of **Crapo** Galvanized Steel Strand near you the next time you need strand.

INDIANA
Steel & Wire Co., Inc.
Muncie, Indiana

PRECAST VAULTS AND HANDHOLES • ELECTRICAL PULL, JUNCTION AND SERVICE BOXES



Reinforced concrete vaults manufactured for large underground electrical projects. • Concrete electrical boxes made to State specifications. Locking lids, ballast notches and side knockouts to accomodate a large range of installations. All popular sizes along with extensions and bases.

*Forni Division,* **CHRISTY CONCRETE PRODUCTS, Inc.**

6150 Hollis Street Emeryville 8, California OLympic 8-7070

**ELECTRICAL CONTRACTORS:**

**You waste a lot of time and money bidding on many jobs you do not get. This costly waste cuts deeply into your profits and you do not make the money you should. We can furnish you excellent electrical estimating service at a saving of over 50% of your present estimating costs. We can furnish you take-offs and man hours only, or we can furnish complete estimates showing detail lists of materials, at current unit prices, and man-hours and labor costs, together with a detailed list of overhead items and profit. You can check each item of our estimate and compare it with your own. Thus you get the benefit of two independent estimators in the preparation of your bids, all at a definite saving in estimating cost.**

***Call us for complete information; without obligation, of course.***

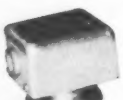
**LeROY CONSTRUCTION SERVICES**

**768 Brannan Street UN 1-2483 San Francisco 3**

Short Stem

TELE-PHONE

DUPLEX NOZZLES



BRASS AND ALUMINUM

Shorter styled, modern, flanged duplex telephone and receptacle nozzles in satin brushed brass or anodized aluminum. Standards fit ½" opening. ¾" stems available. Also ground receptacles.

CAST IRON ADJUSTABLE BOX

Watertight Floor Box — 3½" or 4¼" brass cover plate with 2" or 2⅜" abandon plug for power or ½" ¾" or 1" for telephone service or duplex receptacle nozzles. Equipped with ground wire.

**FULLMAN MANUFACTURING CO.**

**LATROBE . . . PENNSYLVANIA**

**THEY STAY ON.....**

All VICTOR "MAGIC" CLAMPS and STRAPS for Thin and Heavy Wall Conduits have this time-saving snap-on feature.

Contractors everywhere are switching to VICTOR. Cash in on this heavy demand. Add these fast selling, profitable Clamps and Straps to your line.



Write for the new Victor Strap Catalog. Lists over 600 items to fasten Wire, Cable, Tubing and Conduit.




**VICTOR SPECIALTIES, INC.**

775 MAIN ST., NEW ROCHELLE, N.Y.

*The Greatest Single Source for Clamps and Straps*

*California Representatives:*

**STANLEY SALES CORP.**
1122 Folsom Street
San Francisco 3, Calif.
Phone: UNderhill 3-8900

**HAYJAX COMPANY**
436 Colyton Street
Los Angeles 13, Calif.
Phone: MA 8-5256

# Proposed Western Projects

## Alaska and Hawaii

**Ketchikan,** Alaska, City, expansion of electric power system, $1,300,000. R. W. Beck & Associates, Seattle, consulting engineers.

**Kaanapali,** Hawaii, Edward Westgate, Stockton, Calif., Swinerton & Walberg, San Francisco, L. W. C. Tait Corp., San Francisco, Erickson Construction Co., North Sacramento, Calif., 150-room hotel, $3,000,000.

## Rocky Mountain

**Aurora,** Colo., School District 28J, schools, $3,000,000.

**Denver,** Colorado Women's College, library, $600,000; plans by Victor Hornbein & Edward D. White. Residence hall, $800,000; plans by Stanley E. Morse.

**Lakewood,** Green Acres Development Co., 100 residences, $1,600,000.

**Rocky Ford,** Otero County School District No. 3, high school, $1,280,000. Paul E. Pierson, Denver, and Caudill, Rowlett & Scott, Houston, Tex., architects.

**Butte,** Mont., St. James Community Hospital, hospital addition, $2,500,000. Plans by Cushing, Terrell & Associates, Billings.

**Glasgow,** Valley County, courthouse, $1,200,000. Plans by J. G. Link & Co., Billings.

**Great Falls,** Columbus Hospital, hospital remodeling and nurses home, $1,000,000. Plans by Shanley, Shanley & Anderson.

**Brigham City,** Utah, Box Elder County Board of Education, elementary schools, $3,500,000.

**Ogden,** Weber County School District, senior high school, $3,200,000.

**Salt Lake City,** Granite School District, schools, $9,800,000.

**Salt Lake City,** A. P. Nielsen & Ben Davis, seven-story apartment, $1,500,000. Slack W. and David Winburn, architects.

**Salt Lake City,** City and County, public safety building, $7,700,000.

**Salt Lake City,** Industrial Uranium Co., shopping center including 2,000-car parking, $2,000,000 - $2,500,000. Plans by Doane L. Burnett of Von Frellick & Associates, Denver.

**Casper,** Wyo., Sunrise Corp., shopping center including supermarket, variety store, restaurant, drug store, bowling alley, shops, $1,350,000. Plans by Goodrich & Wilking.

**Green River,** School District No. 2, junior high school, $1,000,000.

Plans by Kellogg & Kellogg, Cheyenne.

**Sheridan,** Owner, convention center, motel, dining room, hall, lounge, $1,000,000. In care of J. Gordon Macalister.

## Pacific Southwest

**Phoenix,** Ariz., City, developing satellite airports, $1,000,000.

**Phoenix,** City, police and courts building, $3,000,000.

**Phoenix,** City, airport expansion, $14,200,000.

**Phoenix,** City, parks and playgrounds, $6,100,000.

**Anaheim,** Calif., Rio Vista Building Corp., 63 dwellings, $1,177,220.

**Arlington,** Alvord School District, intermediate school, $1,000,000. Plans by Herman O. Ruhnau, Riverside.

**Los Angeles,** L. A. County, utility-activity building and site development, Charter Oak, $1,385,000. Plans by Williamson & Morris, Long Beach.

**Los Angeles,** County Board of Supervisors, 120-bed hospital, $1,000,000. M. A. Nishkian, Long Beach, consulting engineer.

**Los Angeles,** McCulloch Corp. (1st phase) 12-story office, one-story restaurant, two-level parking; (2nd phase) 11-12-story office; (3rd phase) office building, $20 million. In care of Welton Becket & Associates, architects-engineers.

**Los Angeles,** University of Southern California, shopping center, $1,000,000. Novikoff Engineers, consulting engineers.

**Los Angeles,** Security First National Bank, six-story bank building, $1,500,000. Plans by Albert C. Martin & Associates.

**Los Angeles,** Board of Regents, University of California, four-story medical center addition, $10 million. Plans by Welton Becket & Associates.

**Los Angeles,** L. A. County, juvenile hall, $4,000,000. Plans by Kenneth S. Wing & William Allen, Long Beach.

**SALES AGENTS WANTED**

Sylvania Lighting Products-Fixtures is seeking established sales agencies to represent them in Northern and Southern California. Only applicants with proven sales record and a strong background in lighting fixture specification will be considered. Contact Dept. MPD, Sylvania Electric Products, 48th Street, Wheeling, West Va.

**Los Angeles,** Board of Education, high school, $4,035,000. Plans by Austin, Field & Fry.

**La Habra,** Metropolitan Land Co., 129 dwellings, $2,000,000. David Freedman, Los Angeles, architect.

**Oxnard,** Brighton-Bilt Homes, 130 dwellings, $1,430,000. Plans by William M. Bray, Los Angeles; Neil Cummings, consulting engineer.

**San Pedro,** Ferina Co., 93 dwellings, $1,395,000. William Bray, Beverly Hills, architect.

**Upland,** San Antonio Community Hospital, power plant, shop additions, remodeling existing buildings, $3,000,000. Plans by Harnish, Morgan & Causey, Ontario.

## Pacific Northwest

**Victoria,** B. C., Government of B. C., park including 2,000-car parking, causeway, bridge, picnic areas and camp sites, $1,000,000.

**Contra Costa,** Calif., Pacific Gas and Electric Co., 660,000-kw unit, $73 million.

**Cupertino,** Union Elementary School District, schools, $7,500,000.

**Lathrop,** Libby-Owens-Ford Glass Co., glass fabricating plant, warehouse boiler plant, near $10,500,000.

**Oakland,** Pacific Gas and Electric Co., service center, $2,000,000.

**Palo Alto,** Stanford University, two- and four-story undergraduate library, $4,870,000. Plans by John C. Warnecke, San Francisco.

**Sacramento,** E. A. Corum & Son, 65-unit motel, $1,000,000. Dreyfuss & Blackford, architects.

**San Francisco,** Port Authority, port terminal project, $30 million. John A. Blume & Associates, consulting engineers.

**San Francisco,** Webb & Knapp, 20-story apartment and 22 town houses, $10 million. Plans by Welton Beckett & Associates.

**Bellevue,** Wash., Crossroads Inc., shopping center, golf course, 562-unit apartments, $11 million. In care of Woodman & Associates, architects.

**Renton,** Boeing Airplane Co., airplane manufacturing plant addition, $1,000,000.

**Seattle,** Marfran Co., tourist development, including five-story motel, restaurant, shops, marina, swimming pool, $4,000,000. Plans by R. H. Peck.

**Tacoma,** McChord Air Force Base, 116-unit housing, $1,914,000. Plans by Bassetti & Morse, McClure & Adkinson, W. W. Beck, Seattle.

**Walla Walla,** School District No. 140, high school, $2,300,000. K. W. Brooks & Associates, Spokane, architects.

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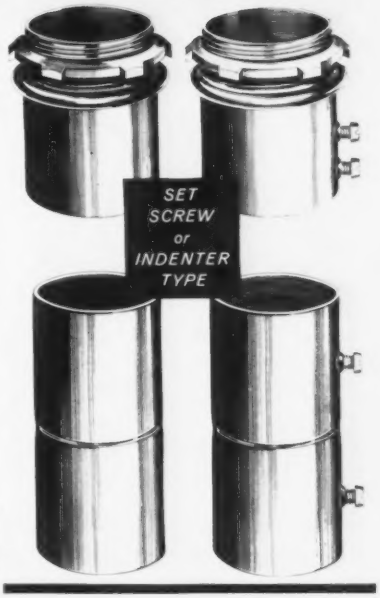


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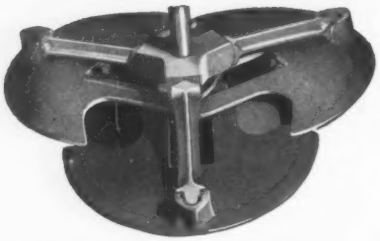

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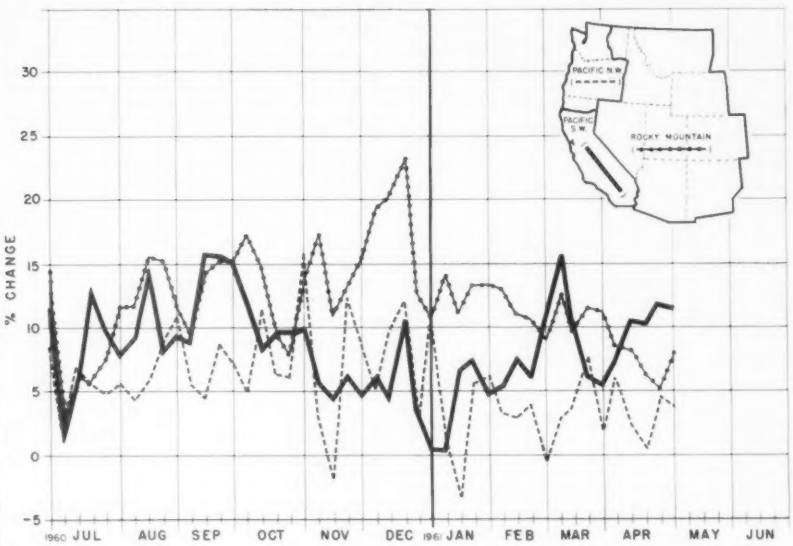
# WESTERN BUSINESS TRENDS &

## Output Comparisons

**Year-to-Year Kwh Output Changes. Per Cent Change Over Same Week One Year Ago for Region as Indicated in Keyed Map**




## Federal Subsidies Spiraling

Mention subsidies, and most people think of payments to farmers. But the federal subsidy program encompasses much more than that. And call them what you will — "handouts" or "investments in the future" — federal subsidies are spiraling. Up 400% in a single decade, such payments last year cost U. S. taxpayers almost $7.5 billion or about 10% of the entire federal budget.

The word "subsidy," which is one of the most derogatory in the lexicon of economics, serves as a popular ploy in the Washington version of one-upman-ship. Let a proposed expenditure be stigmatized a "subsidy," and it is automatically one down. Let it instead be called an "aid" or an "expenditure in the national interest," and it's one up. Under the circumstances, there is plenty of disagreement as to what the word really means. And, almost inevitably, while some legislators are calling a program a "subsidy," others are saying it is nothing of the sort.

## RELATIVE WHOLESALE PRICES OF ELECTRICAL MATERIAL

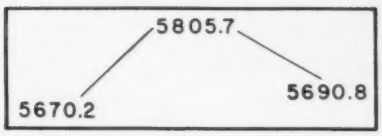
| | Latest Month | Previous Month | Year Ago |
|---|---|---|---|
| Wire and cable | 128.9 | 128.9 | 138.0 |
| Watt-hour meters | 118.6 | 120.9 | 120.9 |
| 10-hp motors | 136.1 | 135.3 | 154.9 |
| 225-hp motors | 182.3 | 182.3 | 223.9 |
| Hydro generators | 185.5 | 185.5 | 198.5 |
| Steam generators | 203.5 | 203.5 | 203.5 |
| 15-kva transformers | 133.0 | 133.0 | 133.5 |
| 50-kva transformers | 131.0 | 131.0 | 141.2 |
| 500-kva transformers | 137.9 | 137.9 | 151.5 |
| Dry-type transformers | 133.7 | 133.7 | 149.6 |
| Switch and fuse panelboards | 126.0 | 126.0 | 132.4 |
| Circuit breaker panelboards | 139.2 | 139.2 | 139.1 |
| Indoor oil circuit breakers | 182.5 | 182.5 | 182.5 |
| Outdoor oil circuit breakers | 155.8 | 155.3 | 182.8 |

Source: McGraw-Hill Department of Economics

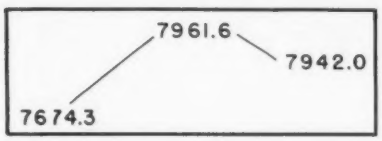
# INDICATORS

## Economy at a Glance

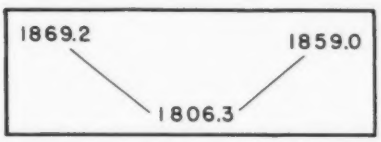
| Year Ago | Month Ago | Latest Month |
|---|---|---|



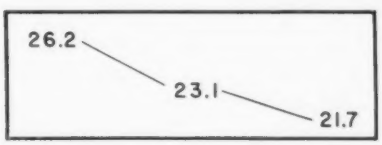

**PERSONAL INCOME** in millions—seasonally adjusted as of May 15 (An index of consumer spending potential)



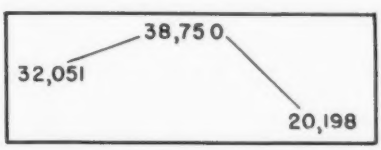

**NONFARM EMPLOYMENT** in thousands (Index of industrial, commercial activity)




**MANUFACTURING EMPLOYMENT** in thousands (A measure of manufacturing activity)




**HOUSING STARTS** in thousands of units (Index of new residential customers)




**INDUSTRIAL BUILDING CONTRACTS** in thousands of dollars (A rough index to the dollars of electrical contracting business six months to a year ahead)

► **Business now plans to spend only 1% less this year for new plants and equipment** than it did in 1960. This is a modest increase in investment plans since McCraw-Hill's survey last fall. And advance plans for 1962-1964 are almost as high as expenditures planned for this year. **Manufacturing companies expect unit sales to rise 3% this year and another 20% by 1964.**

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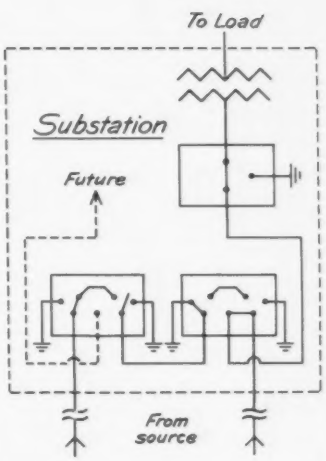


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Phoenix CRestwood 4-5426
Denver CHerry 4-6556
Salt Lake City EMpire 3-1723
Portland CApitol 2-9835
Seattle MAin 4-3737
Spokane FA 7-1581
San Diego BE 2-7355

**Aluminum Co. of America** 26, 27
San Francisco YUkon 6-6484
Los Angeles HUntley 2-2684
Denver DUdley 8-1619
Spokane RIverside 7-6124
Seattle MAin 4-4040
Portland CApitol 2-9861
Boise 2-8038

**American Steel & Wire Div., U. S. Steel Corp.** 100, 101
Columbia-Geneva Steel Div. in following cities:
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Los Angeles LUdlow 5-1171
Portland CApitol 2-9534
Seattle MAin 2-1972
Salt Lake City DAvis 2-0491
Denver AM 6-3001

**Anaconda Wire & Cable Co.** 4
San Francisco PRospect 6-4111
Los Angeles RAymond 3-0581
Denver AComa 2-4816
Seattle MAin 3-4466
Salt Lake City DAvis 8-0616
Phoenix AMherst 0581

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Tucson MA 2-3331
Medford SP 2-9195
Portland CA 8-4173
Seattle EA 3-1270
Spokane MA 4-3285
Butte 2-1219

**Blackburn Corp., Jasper** 102
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Los Angeles: Robert M. Schow HUbbard 3-7931
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Phoenix: W. C. Osborn WIndsor 3-1815
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**Brown Boveri Corp.** 12
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Tucson: Central Station Equip. Co. MAin 3-2493

**Buchanan Electrical Products Corp.** 107
Los Angeles: Frank Rozema MAdison 9-3855
Denver: Fred A. Pease Co. DUdley 8-4643
Portland: Keeler-White CApitol 7-0593
Seattle: Tal Agencies, Inc. MAin 3-2367
Vancouver, B.C., Walter McHugh CHerry 3034

**BullDog Electric Products Div.** 33
(See listing under I-T-E Circuit Breaker Co.)

**Burndy Corp.** 13
Shaffer & Nelson, Inc. following cities:
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Seattle MUtual 2-0186
Spokane FAirfax 7-9528
San Francisco: George E. Henn Co. SUtter 1-7352
Los Angeles: Earl S. Condon Co. DUnkirk 1-3961
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**Chance Co., A. B.** 97
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Bountiful, Utah AXtel 5-7144
Anchorage, Alaska: J. P. Bagoy BR 4-1884
Honolulu: Hugh Bargion HOnolulu 6-8846

**Christy Concrete Products, Inc.** 118
Emeryville, Calif. OLympic 8-7070

**Classified** 119

**Columbia-Geneva Steel Div.** 100, 101

**Condon Co. Inc., Earl E.** 124
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**Davey Tree Surgery Co.** 106
San Francisco SUtter 1-3377
Los Angeles MAdison 3-1929

**Delta Star Electric Div.**
(See H. K. Porter Co. Inc.)

**Duncan Electric Co., Inc.** 109
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Portland: Pacific Electric Sales BElmont 5-4137

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Seattle: A. L. Polich, Inc. WE 2-9011
Albuquerque: Smith Sales Co. AXtel 9-8024

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Portland: Nelson English CApitol 3-9814

**G & W Electric Specialty Co.** 121
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Salt Lake City:
Riter Engineering Co. EMpire 3-7933
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**General Electric Co., Cleveland, Lamp Div.** 37
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Seattle MAin 2-8081
Portland CApitol 3-2101

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**KPF Electric Co.** 10, 11
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**(Continued on page 124)**

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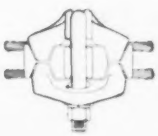

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(Continued from page 122)


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Spokane KEystone 5-2461
Salt Lake City ELgin 5-6257
Phoenix: J. E. Redmond Supply ALpine 4-8471
Boise Phone: 2-5706
Butte Phone: 8340
Denver FL 5-1689 and 1680
Sacramento, Calif. GI 2-6264
Anchorage (Spenard) Alaska FA 2-2649

**Maydwell & Hartzell, Inc.** 5
San Francisco VA 6-6900
Los Angeles MAdison 8-7245
Phoenix BRidge 5-7644
Portland CApitol 8-4173
Seattle EAst 3-1270
Spokane MAdison 4-3285
San Diego JUniper 2-6749
Medford SPring 2-9195
Tucson MAin 2-3331
Butte Butte 2-1219

**Moloney Electric Co.** 25
Garland Affolter in following cities:
San Francisco EXbrook 7-1800
Los Angeles MAdison 4-1864
Portland CApitol 3-7349
Seattle MUtual 2-4950
Denver: Hamilton Associates CHerry 4-2901
Salt Lake Kifer Engineering EMpire 3-7933

**Northwest Elec. Light & Power Association** 14
Portland CApitol 6-3039

**Ohio Brass Co.** 9
San Francisco SUtter 1-5060
Los Angeles MAdison 4-8555
Seattle MAin 2-3842
Denver SKyline 6-7722

**Pacific Coast Elec'l Association** 24
Los Angeles MAdison 3-5610
San Francisco DOuglas 2-1556

**Pacific Gas and Electric Co.** 16
San Francisco SUtter 1-4211

**Paragon Electric Co.** 120
Los Angeles AN 8-3895
San Francisco: McCune-Western, Inc. YU 6-1006
Denver: Roy J. O'Donnell Co. KE 4-0179
Seattle: John B. Merifield Co., Inc. MA 3-7850

**Pennsylvania Transformer Div.** 8
San Francisco: George E. Honn Co. SUtter 1-7352
Los Angeles: John G. Corrin MAdison 2-0830
Seattle: Fred W. Carlson ATwater 4-4630
Phoenix: Roy E. Coulson WIndsor 3-8935
Denver: Peterson Co. DExter 3-5434
Salt Lake City: Clarence W. Silver ELgin 5-5378
Portland; Fred W. Carlson & Associates CApitol 8-3798
Boise, Ida.: Clarence W. Silver Co. 2-6947
Albuquerque: Williamson Sales Co. ALpine 6-6617

**Petersen Engineering Co.** 53
(Contact factory for nearest dealer)
Santa Clara, Calif. AX 6-7712

**H. K. Porter Co., Inc.,**
**Delta Star Elec. Div.** 4th Cover
San Carlos LYtell 1-4461
Albuquerque: Ralph B. Black ALpine 5-9625
Denver: W. E. Young Co. AComa 2-4841
Los Angeles MAdison 6-5651
Phoenix: Daley Elec. Sales Co. Inc. ALpine 4-4176
Salt Lake City: Stevens Sales Co. INgersol 7-5489
San Francisco EXbrook 2-2588
Seattle MAin 4-7066
Tucson: Daley Elec. Sales Co. Inc. MAin 4-6943

**Preformed Line Products Co.** 39, 40
Palo Alto: 600 Hansen Way DAvenport 4-2561
San Francisco: K. M. Kyais Co. YUkon 2-5510
Los Angeles: Earl S. Condon Co. DUnkirk 1-3951
Seattle: Shaffer & Nelson Inc. MUtual 2-0186
Portland: Shaffer & Nelson Inc. BElmont 4-7437
Salt Lake City: Shaffer & Nelson Inc. Hunter 4-3382
Spokane: Shaffer & Nelson Inc. FAirfax 7-9528
Denver: Peterson Co. DExter 3-5434

**Reynolds Metals Co.** 12
San Francisco MIssion 7-2990
Los Angeles DUnkirk 1-3511
Seattle MAin 3-2503
Troutdale, Ore. MOhawk 5-8158
Salt Lake City HUnter 7-7749
Phoenix APplegate 8-3551

**Rome Cable Div. of Alcoa** 15, 98
Los Angeles HUntley 2-2475
San Francisco VAlencia 6-3580
Seattle MAdison 4-3017
Salt Lake City ELgin 9-8811
Denver KEystone 4-0533

**Royal Electric Corp.** 52
Los Angeles: Eckert-Lloyd Co. RIchmond 7-9655
San Francisco: Eckert-Lloyd Co. HEmlock 1-5792
Seattle: Northwestern Agencies MAin 3-8882
Portland: Northwestern Agencies CApitol 7-0434
Phoenix: Wm. Benndorf CRestwood 7-1662
Denver: Strong & Humphrey SH 4-1351

**S & C Electric Co.** 54, 55
Burlingame, Calif. OXford 7-1130
El monte, Calif.: Randolph Eng. Corp. CUmberland 3-4183 and 3-7901 GIlbert 3-1701
Phoenix: Randolph Eng. Corp. ALpine 8-5281
Salt Lake City: Riter Engineering INgersoll 7-9449
Portland: S&C Elec. Co. BElmont 4-5388

**San Diego Gas and Elec. Co.** 65
San Diego BElmont 2-4252

**Sangamo Electric Co.** 6
San Francisco: L. A. Nott HEmlock 1-4738
Los Angeles: (Factory Sales) DUnkirk 7-2336
(Time Switches) ANgelus 8-6771
Seattle: T. R. Wood MAin 3-8204
Denver: Mt. States Machinery CHerry 4-7421
Phoenix: J. E. Redmond Co. ALpine 4-8471
Portland: R. L. Schoenberger CApitol 3-8742
Butte: R. E. McDonough Butte 2-5447
Tucson AXtel 8-4801
Albuquerque: Gorman Engineering CHapel 7-1596
El Paso: Gorman Engineering KEystone 2-3449
Anchorage, Alaska: John P. Bagoy BR 4-1884

**Sherman & Reilly, Inc.** 96
Los Angeles: Matzinger-Johnson MAdison 4-8001
Denver: Hamilton Associates CHerry 4-2901

**Southern California Edison Co.** 38
Los Angeles MAdison 4-7111

**Standard Oil Co. of Calif.** 36
San Francisco SUtter 1-7700
Los Angeles MAdison 4-2711
Portland CApitol 3-4161
Seattle MAin 3-6310
Salt Lake City DAvis 2-5831

**Stearns-Rogers Mfg. Co.** 7
Denver AComa 2-8484

**Subox, Inc.** 116
San Francisco: Wrathall & Krusi EXbrook 7-3593
Los Angeles: R. E. Cunningham & Son MAdison 8-1105
Portland: Wm. J. Cottrell & Assoc. CApitol 7-6191
Seattle: Fred H. Carlson Co. ATwater 4-4630
Denver: Ambler Co. TAbor 5-8885

**Victor Specialties, Inc.** 118
San Francisco: Stanley Sales Corp. UNderhill 3-8900
Los Angeles: Hayjax Co. MAdison 8-5256
Phoenix: George W. Hill WH 6-1657
Salt Lake City: John E. Elggren AXtel 5-0472
Denver: Bacon's Elec'l Equip. CH 4-6563

**Wagner Electric Corp.** 34, 35
South San Francisco PLaza 6-0520
El Segundo, Calif. ORegon 8-7671
Portland CApitol 7-3654
Salt Lake City EMpire 3-5013
Denver CHerry 4-7421
Seattle MAin 2-2342

**Westinghouse Electric Corp.**
**17, 18, 19, 20, 21, 22, 50, 51, 57, 58, 59, 60, 61, 62, 63, 64, 89, 90, 91, 92**
San Francisco EXbrook 2-5353
Los Angeles MAdison 6-3881
Denver KEystone 4-8121
Phoenix ALpine 8-8621
Salt Lake City ELgin 5-3413
Seattle MAin 2-0808
Portland ATlantic 8-6311
Spokane FAirfax 8-3371

Malleable Iron Liquid-Tite Connectors

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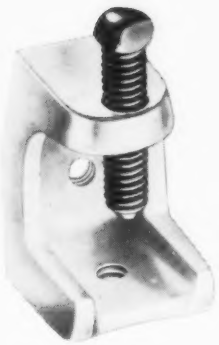
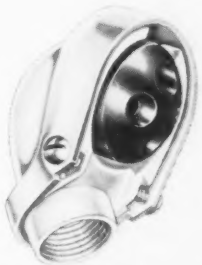
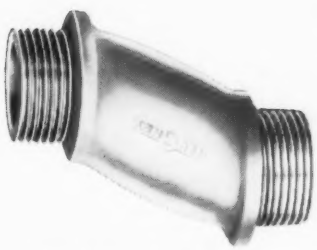


M.I. Beam Clamps

M.I. 90° Corner Adapters and Corner Elbows



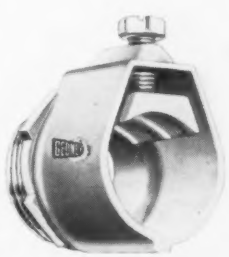
M.I. Entrance Caps



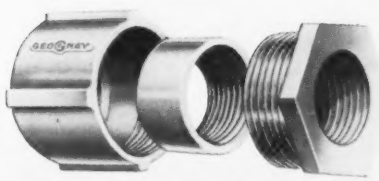
M.I. Offset Connectors and Offset Nipples

M.I. Insulated Bushings

M.I. Conduit Bodies



M.I. Armored Cable & Non Metallic Connectors



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